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The Gift of
Charles L. Flint
(Class of 1849)
the Secretary of the
Massachusetts
Board of Agriculture
29 April 1858

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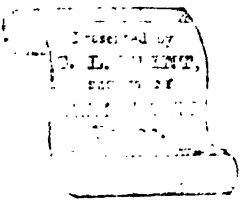

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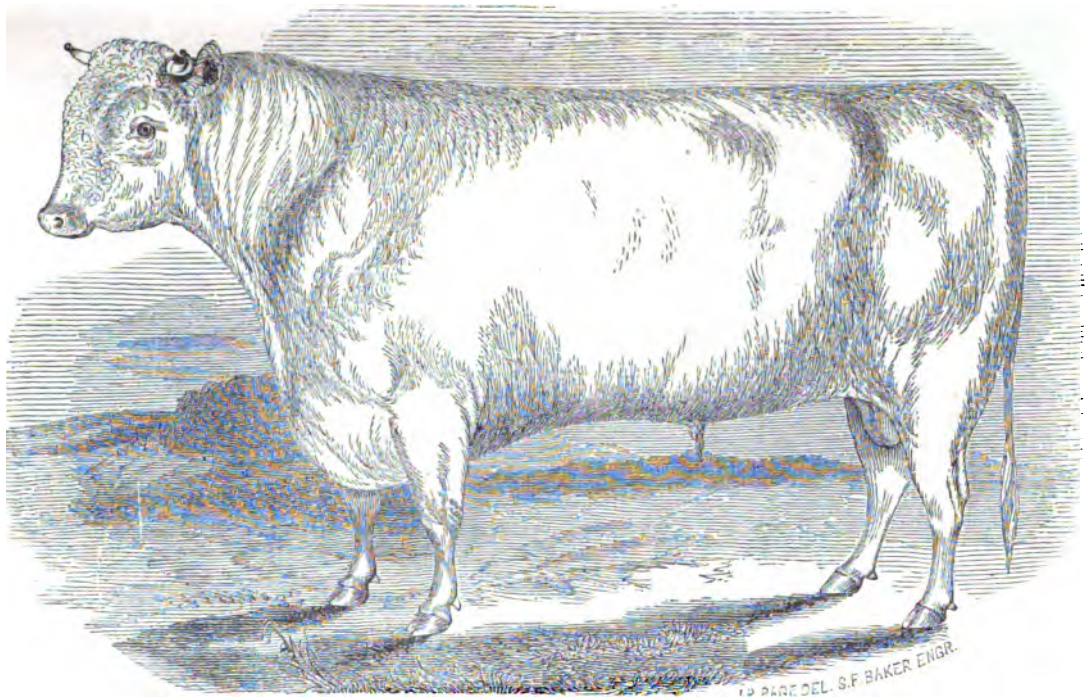

Echo of Oxford, (12821.)

Echo of Oxford, (12821) E. H. B., White, bred by N. J. Becar, Smithtown, Long Island; owned by E. Marks, Camil'us, N. Y.; calved Jan. 25, 1854, got by imported Romeo, (13619.) 1 dam, Oxford 13, by 3d Duke of York, (10166.) 2 dam, Oxford 5, by Duke of Northumberland, (1940.) 3 dam, Oxford 2, by Short Tail, (2621.) 4 dam, Matchem cow by Matchem, (2281.) 5 dam, ——— by Young Winyard, (2859.) Echo of Oxford, (12821,) took the first prize in his class at the New York State Fair, in 1856; his dam took the first prize at the New York State Fair, in 1853; his sire took the first prize at the New York State Fair, and also at the Fair of the American Institute, in 1853, also at the National Fair in Boston, 1855. At the latter Fair, Echo of Oxford (12821) was one of the five Animals which took the first prize for Short Horn herds.

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TRANSACTIONS

OF THE

N. Y. State Agricultural Society,

WITH AN

ABSTRACT OF THE PROCEEDINGS

OF THE

COUNTY AGRICULTURAL SOCIETIES.

VOL. XVI.—1856.

ALBANY:
C. VAN BENTHUYSEN, PRINTER TO THE LEGISLATURE,
No. 407 Broadway.
1856.

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1858 April 22

The Gift of

Charles L Flint Esq of Bath

Class of 1849

Secretary of the Massachusetts

Board of Agriculture

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NOTICE.

The Sixteenth Volume of the Transactions of the New-York State Agricultural Society is presented to the farmers of New York. This volume, it is hoped, will be found of equal interest with those which have preceded it. It has been the endeavor of the undersigned to make it useful to the farmers. This is the great object that has been kept in view in the preparation of the volumes of Transactions which have been submitted to the farmers of the State.

There is a considerable portion of each volume occupied with the proceedings of the Societies, as required by statute, and although to the general reader these may not be as interesting or useful as the more extended articles, yet, they have a local value in connexion with the Societies, which render them useful, and many of the proceedings are of a character that will interest and profit every careful reader.

The third series of Dr. Fitch's articles on the Entomology of our State will be found of equal interest to those which have preceded it; and the attention which those have received, not only in this country but in foreign countries, shows the great value of this work. We are satisfied that no examination hitherto made by our State, will prove of as much practical value as this. The farmer, the horticulturist, are directly interested in this investigation. And, we may ask, what class of our citizens are not interested? Every tree, and shrub, and blade of grass; every fruit, every variety of grain and vegetable, are alike subject to the depredations of insects; and when their habits shall be fully investigated and understood, what incalculable benefits will result to the whole community. If no other investigation had been undertaken by the Society, this of itself will secure more advantages and benefits to our State than all the expense hitherto paid to the agricultural interest by the Legislature.

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In this report will be found a description and figure of the locust from the Isthmus of Darien, which is committing such destructive ravages in the Southern section of our country. The Minnesota grasshopper from Lord Selkirk's settlement is also figured and described. These show the farmers what enemies are to be contended with.

The articles by Professor Johnson of Yale College, on soils, their physical properties, &c.; by Professor J. A. Nash, on American agriculture, and by C. E. Goodrich, on the diseases of the grape and sugar cane, will be found interesting and useful.

The census returns have been given in full so far as the agriculture of the State is concerned, and as they are far more extensive than previous ones, will be found valuable not only for the present, but for future reference.

The exercises at the dedication of the Agricultural Rooms, will be read with interest by every farmer in the State. The day long hoped for has arrived, when at the capital of the State, most commodious rooms have been secured, which for all time to come will be preserved as the head quarters of the great agricultural interest of the State, where will be exhibited the various implements, machinery and products, showing the state and progress of agriculture from year to year.

The address by Hon. Wm. Jessup will be found a most excellent one, on the *Moral Grandeur and Dignity of Agricultural Labor*. The farmer as he reads it will be better satisfied with the position which he occupies in our land, and every succeeding year it is hoped will render him better prepared to sustain and support the profession which he has chosen.

In connection with the report on butter, we have given a very valuable paper on dairy cows and their management, by T. Horsfall, England, and one on the nutritive and fattening qualities of grasses, by Professor Way, of England. Although a portion of these articles have been published in this country, yet we deem them of such practical value to the great interest of our State, as to justify their publication in our Transactions. They embody the most valuable experiments which will prove of inestimable advantage to the careful dairyman, as he will find Mr. Horsfall's paper a clever and able examination of the most profitable

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method of feeding dairy cows, and Professor Way's analysis of grasses exhibits more fully than any previous work their relative advantages.

A reference to the more important articles which have appeared in the former volumes of the Transactions has long been called for. To answer this demand the index of the sixteen volumes published are given in this volume; and although not as perfect as could have been desired, it will be found to record the most valuable articles with the names of their authors, and we presume that our readers will be surprised as we have been, at the number of articles of great value to the farmer, embodying almost every practice needed by him in prosecuting his work. Several of those who have furnished some of the best papers in the Transactions have ceased from their labors, but their works here, remain a record of their faithfulness, and of the inestimable value of their labors to the cause to which while living they so intelligently devoted themselves.

To the gentlemen who have contributed to this volume we are under great obligations. They will have their reward in the assurance that their works will reach the minds of the most intelligent agriculturists in our country and abroad, and the influence upon them will, it is hoped, conduce to more systematic efforts to advance the cause to which their efforts have been devoted.

B. P. JOHNSON.

State Agricultural Rooms, *March*, 1857.

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CONSTITUTION OF THE NEW-YORK STATE AGRICULTURAL SOCIETY.

The style of this Society shall be "The New-York State Agricultural Society." Its objects shall be to improve the condition of Agriculture, Horticulture, and the Household arts.

SEC. 1. The Society shall consist of such citizens of the State as shall signify in writing, their wish to become members, and shall pay on subscribing not less than one dollar, and annually thereafter one dollar, and also of Honorary and Corresponding members.

The Presidents of County Agricultural Societies, or a delegate from each, shall ex-officio be members of this Society.

The payment of ten dollars or more shall constitute a member for life, and shall exempt the donor from annual contributions.

SEC. 2. The officers of the Society shall consist of a President, eight Vice Presidents, one to be located in each Judicial District; a Recording Secretary, a Corresponding Secretary, a Treasurer, an Executive Committee, to consist of the officers above named, and five additional members, and five of the Ex-Presidents shall be ex-officio members of the Executive Committee, and these five shall consist of the five Ex-Presidents whose term of office has last expired, of whom three shall constitute a quorum; and that the Ex-Presidents of the Society, not members of the Executive Committee, shall constitute a Board of Counsellors, to which may be referred, for consultation and advice, all questions that may from time to time arise, and in the decision of which the Society may in any manner be interested; and a General Committee, the members of which shall be located in the several counties, and be equal to the representations in the House of Assembly.

SEC. 3. The Recording Secretary shall keep the minutes of the Society. The Corresponding Secretary shall carry on the correspondence with other Societies, with individuals and with the General Committee, in the furtherance of the objects of the Society.

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The Treasurer shall keep the funds of the Society, and dis burse them on the order of the President or a Vice President countersigned by the Recording Secretary, and shall make a report of the receipts and expenditures at the annual meeting in February.

The Executive Committee shall take charge of and distribute or preserve all seeds, plants, books, models, &c., which may be transmitted to the Society ; and shall have also the charge of all communications designed or calculated for publication, and so far as they may deem expedient, shall collect, arrange and publish the same in such manner and form as they shall deem best calculated to promote the objects of the Society.

The General Committee are charged with the interests of the Society in the counties in which they shall respectively reside, and will constitute a medium of communication between the Executive Committee and the remote members of the Society.

SEC. 4. There shall be an annual meeting of the Society on the second Wednesday of February, in the city of Albany, at which time all the officers shall be elected by a plurality of votes and by ballot, with the exception of the General Committee for the counties, which may be appointed by the Executive Committee, who shall have power to fill any vacancies which may occur in the officers of the Society during the year. Extra meetings may be convoked by the Executive Committee. Fifteen members shall be a quorum for the transaction of business.

SEC. 5. The Society shall hold an Annual Cattle Show and Fair at such time and place as shall be designated by the Executive Committee.

SEC. 6. This Constitution may be amended by a vote of two-thirds of the members attending any annual meeting, upon one year's previous notice in writing.

STATE AGRICULTURAL ROOMS, }
February, 1857. }

I certify the above to be a true copy of the Constitution of the New-York State Agricultural Society.

B. P. JOHNSON,
Cor. Secretary.

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6th district, FRANCIS M. ROTCH, Otsego.
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Y.

YELVERTON, ROBERT, New-York.

* Deceased.

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ILLUSTRATIONS.

Short horn bull, Oxford, ... frontispiece.
State Agricultural Hall, ... 41
Cut of the calving cow, ... 289
Butter worker, ... 267
Insects, ... 315 to 491

Digitized by Google

CONTENTS TO VOLUME XVI.

Page

Introduction, ... iii
Constitution, ... vii
Officers, ... ix
Life Members, ... xi
Illustrations, ... xiv

A.

Annual Report, ... 3
Address of Hon. Wm. Jessup, ... 13
Annual Meeting, ... 22
Address, T. S. Faxton, President, ... 33
Address, A. S. Upham, ... 39
Agricultural College, ... 58
Agriculture Am., its position and prospects, ... 183
Agricultural Statistics, census 1855, ... 201, 291
Analysis of cream, ... 232
do Pasture grasses and hay, ... 262, 263
do Nutritive and fattening qualities, ... 244
do Natural and artificial grasses, ... 252, 253
do Weeds, ... 255, 256
do Milk, ... 719
do Excrement from cows, ... 720
do do of fattening cattle, ... 728, 730
do Butter, ... 746
do Beans, ... 755, 756
Agricultural County Associations, ... 491
Albany and Allegany Agricultural Societies, ... 492

Digitized by Google

Page.

B.

Bogart, W. H., remarks, dedication Agricultural Rooms,.... 67
Baldwin, Harvey, remarks, do 81
Butter, quarts of milk per lb.,..... 222, 230, 234
do Report, Watertown,..... 257
do B. S. Carpenter, statement,..... 258
do H. N. Kimball, do 259
do M. G. and G. H. Norton,..... 260
do D. Minthorne, new method, making,..... 261
do Dairies, Cortland County,..... 262
do Making, S. E. Todd,..... 262
Brodie, John, large crop carrots,..... 274

C.

Cheever, Samuel, address, dedication Agricultural Hall,.... 49
Compost heap, how made,..... 90
Corn, how cultivated,..... 92
Canada Thistles, how subdued,..... 96
Census 1855, Agricultural,..... 201, 291
Carpenter, B. S., butter statement,..... 258
Cheese report,..... 269
do J. W. Carpenter, statement,..... 276
do Nelson Fry, do 271
do Dairies, Cortland County,..... 273
Carrots, large yield, J. Brodie,..... 274
Corn, H. Greeley's premium,..... 278
Calving cow,..... 289
Cattaraugus county report,..... 483
Cayuga do 486
Chautauque do 486
Chemung do 497
Chenango, report, season and products,..... 498
Clinton do 500
Columbia do 502
Cortland do 504

D.

Dedication Agricultural Hall,..... 41
History of Society by B. P. Johnson,..... 43
Cheever, Samuel, address,..... 49

Digitized by Google

Page.
Bogart, W. H., remarks,..... 67
Peters, T. C., address,..... 69
Kelly, Hon. Wm., remarks,..... 74
Gov. King, do 79
Baldwin, Henry, remarks,..... 81
Dairy statistics, T. C. Peters,..... 70
Disease, grape and sugar cane,..... 125
with the remedy, ... 134
Dairy report, B. P. J.,..... 221
Dairy quarts of milk per lb. of butter, ... 222, 230, 234
Dairy cattle management, by T. Horsfall,..... 223
Treatment of cows to secure rich cream, ... 231
Analysis of cream, ... 232
Dairy in winter, ... 237
Stewing food profitable,..... 238
Weighing cattle, ... 238
Cows must be kept in good condition,..... 239
Pasture grasses and hay, analysis of,..... 242, 243
Nutritive and fattening qualities of grasses, ... 244
Natural grasses,..... 248
Artificial grasses, ... 249
Artificial grasses most nutritive, ... 251
Analysis, natural and artificial grasses, ... 252, 253
Analysis of weeds, ... 255
Dairy management,..... 709
Different methods feeding dairy cows, Mr. Horsfall, ... 711
Quantity and description of food, ... 718
Analysis of milk,..... 719
Analysis of excrement from cows,..... 723
Value of food for cattle as compared with it for manure,..... 721
Quantity of food for cow per day,..... 723
Analysis, excrement fattening cattle,..... 728, 730
Sugar and starch in food,..... 732
Value of various articles of food for feeding purposes, 736
Cost of food,..... 738
Weight and yield of milk,..... 740
Butter from Alderney cows,..... 742

Digitized by Google

Page.
Trial of food for cows, ... 743
Quantity of butter, ... 745
Analysis of butter, ... 746
Rape cake, its use, and analysis of, ... 747
Mode of hay making, ... 750
Rape plant for cows, ... 753
Rotation of crops, ... 754
Analysis, beans, ... 755, 756
Pleuro pneumonia, its treatment, ... 758
Lehmann's Philosophical Chemistry, ... 766
Dairy cows, ... 262
Dike, A. J. and A., maple sugar, ... 274
Dalaware county report—crops, ... 505
Dutchess, report, ... 507
Dynamometer, Hurlbut's, ... 600

E.

Executive Committee annual report, ... 3
Essay on physical properties of soils, S. W. Johnson, ... 101
Elk, American, domesticated, ... 285
Erie and Essex, reports, ... 510

F.

Fairs, permanent location, rejected, ... 29
Faxton, T. S., address, ... 33
Farm report, ... 85
Farm statement, Walrath's, ... 87
Fry Nelson, cheese statement, ... 271
Fitch, Dr. A., 3rd Report on Insects, ... 315
Insects affecting—The apple .....
The trunk and the root, ... 321, 330
The limbs and twigs, ... 330
The leaves, ... 333, 337
The fruit, ... 347
Affecting—The pear, ... 349
The trunk, bark and limbs, ... 349
The leaves and fruit, ... 354
Affecting—The quince, ... 355

Digitized by Google

Page.
Affecting—The peach,..... 356
The root, trunk and limbs,..... 356
The leaves,..... 357
The fruit,..... 359
Affecting—The nectarine, apricot,..... 360
Affecting—The plum, trunk and leaves,..... 360
The fruit,..... 365
Affecting—The cherry,..... 366
The trunk and limbs,..... 366
The leaves,..... 368, 385
The fruit,..... 385
Affecting—The grape—the stalk,..... 388
The leaves,..... 389–415
Affecting—The currant—the stalks,..... 416
The leaves,..... 427
Affecting—The gooseberry—the fruit,..... 436
The hickory—the trunk and limbs, 438
The bark and leaves,..... 442, 444
The fruit,..... 459
The black walnut, butternut,..... 462
Trunk, limbs, leaves,..... 462, 467
The chesnut—trunk, limbs, leav and fruit,..... 468–472
The hazelnut—trunk, leaves and fruit,..... 473–477

SUPPLEMENT.

Emasculating bot-fly—affecting squirrels,..... 478–485
Lintner's butterfly—Irene butterfly,..... 485
Three colored Lithosia—golden butterfly,..... 486
Johnson's Cicindela, gigantic locusts of tropical America,.. 487
Long horned caty-did,..... 489
Crested leader, Latrelle's and Half-red locusts,..... 490

Franklin county, report,..... 510

Digitized by Google

Page.
Fulton and Hamilton, report, ... 511
Fruit tree labels, J. C. Hastings, ... 626

G.

Grape and sugar cane disease, Goodrich, ... 125
Grasses, nutritive and fattening qualities, Professor Way, ... 249
Greeley, Horace, premium to boys, ... 278
Genesee, report, ... 511

H.

Hops, their culture, ... 93
do Gathering and drying, ... 94
Heat, how conveyed to soils, ... 113
Heat, relation of water to, ... 115
Horsfall, T., on dairy cows, ... 223, 709
Hayward, E. S., culture, Timothy seed, ... 277
Howell, Robert, crops of Tioga, ... 561

I.

Index to Transactions from 1841 to 1855 inclusive, ... 648–704
Insects, Dr. Fitch's report, ... 321, 490

J

Jessup, Hon. Wm., address, ... 13
Johnson, B. P., History Society, ... 43
Johnson, S. W., essay on Soils, &c., ... 101
Jefferson county viewing committee, ... 513
Farms and dairies, ... 517, 518

K.

Kelly, Hon. Wm., remarks dedication Agricultural Hall, ... 75
King, Governor John A., remarks, do ... 79
Kimball, H. N., Butter statistics, ... 259

L.

Lewis, report, ... 523
Livingston, report, ... 524

M.

Milk, analysis of, ... 223
Milch cows, food for, ... 224
Rape cake for, ... 223

Digitized by Google

Page.
Weighing milch cows,..... 226
Effects of milch cows on fertility of land,..... 228
Richness, milk and cream,..... 229
Minthorn, D., new method making butter,..... 261
Maple sugar, A. J. and A. Dike,..... 273, 274
Mattoon, J. P., corn, (Greeley's premium,)..... 283
Madison, report,..... 525
Monroe, report,..... 527
Address, Gov. Hunt,..... 532
Montgomery, crops,..... 534

N.

Nash, Prof. J. A., essay on Agriculture America,..... 183
Norton, M. G. and G. H., butter statistics, hard water to make, 260
Niagara, report,..... 536

O.

Officers, 1857,..... 29
Ottley Milton, corn statement, (Greeley's premium,)..... 280
Oneida, report,..... 536
Ontario, report,..... 536
Report on farms,..... 539
Orange, report,..... 542
Minor & Horton's plow,..... 544
Orleans, report,..... 541
Oswego, new society, report,..... 545
Oswego, old society, do 546
Otsego, report,..... 547

P.

Profession of agriculture, Jessup,..... 29
Peters, T. C., address dedication Agricultural Hall,..... 69
Potatoes, how to prepare the ground,..... 91
Putnam, report,..... 549
Premiums at fair, Watertown,..... 583
Plow, Barton's Reversible,..... 664
Pears at State Fair,..... 627
Premiums at winter meeting,..... 630

Digitized by Google

Page.

Q.

Queens, report, ... 550
B. P. Johnson's address, ... 551
Trial of mowers, ... 552

R.

Rensselaer, report, ... 554
Rockland, report, ... 556

S.

Science practically applied, ... 5
Salt, destructive wire worm, ... 95
Salt, injurious to hay, ... 96
Soils, physical properties, &c., Johnson, ... 101
Soils, ... 103
Soils, power to absorb and condense, ... 104
Soil, permeable to water, ... 106
Soils, retentive powers for water, ... 110
Soils, shrinkage on drying, ... 111
Soils, heat in relation to, ... 112
Soils, color of, &c., ... 118
Soils, cool and warm, ... 119, 121
Soils, cohesiveness, ... 122
Soils, absolute weight, ... 123
Spaulding, F. G., corn statistics, (Greeley's premium,) 278
St. Lawrence, report, ... 557
St. Lawrence International Society, report, ... 557
Saratoga, report, ... 557
Schuyler, report, ... 558
Sullivan, report, ... 559

T.

Treasurer's Report, ... 22, 635
Temperature of earth, how, ... 119
Todd, S. E., butter making, ... 262
Timothy seed, E. S. Hayward, ... 277
Tioga, report of fair, ... 559
Crops of corn, Robert Howell, ... 561
Tompkins, ... 564
Town union associations, ... 575, 579

Digitized by Google

Page.

U.

Upham, E. S., remarks, ... 39
Ulster, report and statement, crops, ... 564

W.

Walrath, Sol., State farm, (premium,) 87
Wheat, spring, how cultivated, ... 92
Wheat midge noticed, ... 95
Wire worm, (killed by salt,) 95
Way, Prof., analysis grasses and weeds, ... 249
Weeds, analysis of, ... 255
Warren, report of organization, ... 566
Washington, report, ... 567
Henry Holmes, death of—resolutions, ... 568
Wayne, report, ... 569
D. W. Van Slyck—resolution thanks, ... 570
Westchester, report, ... 570
Wyoming, report as to conducting fairs, ... 570
Wool-growers' Association, ... 581

Y.

Yates, report—advantages of associated effort, ... 572

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State of New-York.

No. 213.

IN ASSEMBLY, MAR. 26, 1857.

COMMUNICATION

From the Corresponding Secretary of the New-York State Agricultural Society.

AGRICULTURAL ROOMS,
Albany, March 26, 1857.

To the Hon. DEWITT C. LITTLEJOHN,
Speaker of the Assembly:

In pursuance of the acts of the Legislature, for the promotion of Agriculture, I present herewith the annual report of the New-York State Agricultural Society, with the proceedings of the Executive Committee, and abstracts of the reports of County societies, for 1856.

Very respectfully yours,
B. P. JOHNSON,
Cor'g Secretary.

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TRANSACTIONS

OF THE

New-York State Agricultural Society.

Report of the Executive Committee for 1856.

TO THE LEGISLATURE OF THE STATE OF NEW-YORK.

The past year has been one of progress among the farmers of our State. The exhibitions of our State, County and Town organizations, all indicate that an advance of a most cheering character has been made, and the spirit of improvement which has been manifested in many of our counties is much greater than at any former period.

It is among the most encouraging features of the present day, that farmers are inquiring frequently and earnestly, as to the best means of advancing their interests. The communications which have been received at the rooms of the Society, in relation to the farming interest, have been much more numerous than at any former period; and it is due to the farmers to say that they are now as ready to act, as they are to inquire as to what is best to be done.

In every portion of the State, from which returns have been received, we are assured that attention is being given to drainage where needed; deep culture also, in soils requiring it, is being practiced; and in every branch of the management of the farm, there are many to be found who are devoting themselves with intelligent zeal to advance their interests. The progress of the farmer is naturally compa-

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ratively slow; but as one improvement after another is brought to his notice, is tested, and proves successful, the work goes on; and although in a single year, much may not be visible, yet in a series of three or five years, it is most evident that real advances have been made, and very gratifying results attained. Many more experiments have been made during the past year, than for several preceding years; and the reports which have been presented to the Society, embody several of these, which it is believed must prove useful.

The Executive Committee desire in all their communications with the farmer to encourage these investigations, not upon an extensive scale at first, but sufficiently to secure results that may be reliable; and it is believed that this has been in a great measure secured, and that a rich reward will eventually be given to the farmer.

The second of Dr. Fitch's reports, which appears in the Transactions for 1855, has been most favorably received in every part of our country. The value of his work can only be estimated by the destructive ravages of myriads of insects infesting our gardens, our orchards, our fields and our forests, which it is designed, as far as possible, to protect us against. As he shall further progress, still more important advantages will be derived from his work. The report to be submitted will be found of very great interest, and shows the great extent of the work yet to be accomplished.

The progress of agriculture in this State since 1841, when this Society held its first public fair, after remodelling its constitution, has been in the highest degree encouraging. The improvement is evident in the superior method of cultivating the farm, which is observed in every county in the State. A still equally noticed advance has been made in the superior kinds of live stock, which are being rapidly disseminated. To the implement maker the farmer is greatly indebted for the increased facilities which have been afforded him by the improvements which have been made in the implements for the use of the farmer. Who that remembers the rude implements of 1800, but must be astonished at the great change which has been wrought; and we are still progressing every year, lightening the toil of the farmer, increasing the products of the farm, and adding largely to the prosperity and wealth

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of our State. The progress which has been made in the Fruit department, is also most gratifying. In every section of our State fruits recommended by our Horticultural and Agricultural associations, are superseding the worthless fruits formerly cultivated, and the portion of the farm devoted to fruit culture is now becoming as remunerating as any, in favorable seasons. Men of science and of study have aided the farmer in his work, and although all has not been accomplished which the too ardent friends of science at one period expected would have been realized; still the farmer has been benefited. The great work is to be wrought out upon the farm, is to be done by the practical man, but science must and will aid him, lighten his toil, brighten his prospects, and prepare him for a more prosperous future.

We have at last secured the establishment of an institution for the education and improvement of the farmers' sons. It is hoped that before another year closes, its first class will be received and commence their course of study. It cannot be expected that immediate results are to follow; education and improvement are the work of time, and we must wait for the full development of the benefits of the institution, until it shall have sent forth thoroughly educated young men, prepared upon the farm to apply what they have learned during their period of study and investigation. To make this institution what it should be, it must receive the cordial support of the farmers of the State. It is more immediately established for their benefit. Sustain it then! Contribute to its funds until it shall be fully endowed, and education is brought within the reach of the son of the farmer or mechanic of the most limited means. See to it, that this institution so long desired, does not languish from the want of that encouragement so all important to its permanent establishment and success.

It is important that the man of science and the practical workingman should be brought together. That this may be done, can scarcely admit of a doubt. In our country, where education is so widely diffused among all classes, the same objections do not exist as in European governments. The American mind, ever active, can be brought into useful channels, if we can secure the co-operation of scientific men. Let the scientific associations have in their sections one for the purpose specially of extending the re-

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searches of science to the practical pursuits of our country. We shall be greatly disappointed if this should not prove the most valuable portion of their labors.

Knowledge, to be useful in an extended sense, must be set to work—and the scientific man can extend his usefulness by bringing himself in contact with the practical men of our country—and thus contribute to the elevation of a large majority of our people who are now excluded from the benefits which science might give them. Science has nothing to lose but everything to gain by adopting this cause. We feel assured that this will be done. America will yet work out successfully the problem, and *educated labor* will stand pre-eminent among the advances secured by our free institutions. Instead of Elihu Burritt and Hugh Miller being the representatives of this great class, men will be found in every State, in every county, who will do honor to science and to mankind; and then will our country demonstrate to the world the great advantages which our institutions secure over those of most other countries. Every friend to progress, every well-wisher to the elevation of our countrymen in the walks of education and science, will surely unite in this great work and secure its complete triumph.

In all the ordinary pursuits of our farmers, they have been successful during the past year, and while some of their products have diminished in value, others have risen; and the people at large have occasion to rejoice at the prosperity which reigns throughout our State.

The great competing fields of the Western States now opening up the rich prairie to the farmer, will render it necessary for our farmers to vary their system of operations; but they are in time forewarned of this new competition, and will, it is believed, be prepared to meet it, without diminishing their returns from the bountiful soil they cultivate.

A somewhat extended examination of the Agricultural districts of the State, has satisfied us that the improvements which are now making in the farmer's dwellings, in the management of his grounds, in the careful disposition of the farm itself in all its details, is much more extensive than at any former period. We could point to instances, and those not a few, in every county which we have visited, where neatness and order prevail, that can

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scarcely be excelled in any country, and we are satisfied that every year will add to the number of those who are thus devoting themselves intelligently in developing the resources of our State. The farmer himself is improving; his library, stored with Agricultural works and with papers adapted to his calling, shows that the mind is improving, and soon we shall find, as our schools shall be improved, the great body of farmers of our State as well educated and as capable of conducting all the affairs that may fall in their way, as any other body of our citizens. This is a result most desired, and we cannot doubt that as the means to accomplish it are furnished, that the great body of the Agriculturists of our State will not fail to avail themselves of the facilities which are presented.

Agricultural Hall and Museum.—Since 1844 the securing of rooms, adapted to the wants of the Society, where the Library and collections could be suitably arranged, and where the farmers could assemble and feel that they were properly provided for, has been constantly kept in view. In 1853 a bill was introduced for this purpose, and in 1854 and 1855 acts were passed to erect suitable buildings for the purpose. It is an honor to the State, and no citizen who now visits the seat of Government, but feels a pride in entering the rooms dedicated to the great Agricultural interests of the State. The rooms assigned for the Society were constructed under direction of the Executive Committee—and it is gratifying to be informed, by distinguished gentlemen who have visited most of the European Governments, that they have not seen any establishment for like purposes superior to that we are now occupying. May the farmers and mechanics of New-York, fill these rooms with their products and inventions, so that we can with just pride point to our collection as equal to any to be found in any country.

The system of International Exchanges of books, seeds and implements, introduced by Alexander Vattemare, some years since, has become a very important agency. Our Museum now has a very large collection of grain and seeds, received from England, Scotland, France, Hungary, Bavaria, Austria, Russia, Japan, &c., and we have sent in exchange seeds to these countries, where many of them have been tried and proved useful. We have distributed to farmers and others many of the seeds we have

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received, and we shall doubtless derive great advantage from some of the varieties thus distributed.

We need a large collection of grain and seed to distribute abroad—and we rely upon those interested in Agriculture to furnish us with the means to continue this exchange, for which we shall ever be ready to make returns. We have received within a few days a letter from Hungary, giving an account of the successful trial of seeds forwarded them two years since, and from France we have letters urging us to send larger collections for distribution, as the inquiries from Agricultural Associations are frequent, desiring American grain and seeds for trial. A wide field is here opened to us, which at comparatively little expense may eventuate in great good to our country.

We ask of the farmers of the State, whenever they visit the Capital of the State, to call at the rooms and see what has been already done—and if you have the means of increasing the interest or usefulness of the collection, let it be done—and thus your name will go down to posterity with those who have benefited their country and the world.

In relation to the completion of the rooms of the Society, it is proper to observe that the last Legislature adjourned without passing the supply bill, which contained appropriations for completing the Agricultural rooms, and continuing Dr. Fitch's Entomological investigations and other matters. As the mechanics employed by the Commissioners of the Land Office were at work when the Legislature adjourned, and as the work must be suspended unless means were provided, the Executive Committee, at the request of the Commissioners, agreed to pay the mechanics for the work to be done, and the rooms have been completed, at an expense to the Society of $3,495.77—and Dr. Fitch's salary of $1,000 has been provided for and some other charges paid, amounting in the whole to $4,595.77. The present Legislature has passed a bill providing for these expenses among others. The necessary amount will soon, it is expected, be ready to reimburse the treasurer for the amount expended.

It is important in the future operations of the Society, that advances should be made in various departments, where as yet but litte reliable information can be given to the farmer. This is peculiarly important in relation to the value of the different

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breeds of animals which we have in our State. We have representatives of the various breeds of domestic animals from abroad, equal to any that can be found in other countries—and we see no reason why they cannot be reared here in every respect equal to any that can be found abroad. But these various breeds of cattle, sheep, swine, &c., have each their advocates, and yet we have no reliable experiments, showing the comparative value of these various breeds, as regards flesh, milk, wool, &c., for a given quantity of food consumed. This can be ascertained, and the importance of ascertaining these facts must be apparent; and careful and long continued experiments may be necessary to establish satisfactorily, the value of the different breeds in this respect. It will require time and money to go through these experiments—but is it not an object worthy of the Society to endeavor to accomplish? It is hoped that at the Agricultural College, which is now established, and which will ere long be in successful operation, that experiments may be made in relation to these and various other matters, which now rest upon opinions merely, and may be definitely settled by careful and reliable experiments, which will commend them to the practical farmer. We desire to present this subject for the consideration of those who are most interested, and should gentlemen who are engaged in breeding be willing to put their animals in the charge of some competent and disinterested man, to make the experiments, the Executive Committee would take great pleasure in carrying them out, should the means be furnished them for so doing.

The Executive Committee desire to specially notice the liberal premiums offered by Hon. Horace Greeley of New-York, to young men under eighteen years of age, for the most approved culture of an acre of Indian corn and an acre of carrots. This offer has brought several competitors, and the result of their labors will be examined by a committee appointed for that purpose.

Another gentleman, Doct. W. D. Cook, of Sodus, Wayne county, has offered a premium of $50 for a reversible plow, to be tried under the direction of the Executive Committee. Already this offer has brought before the Executive Committee one plow which has secured the approval of those who have tried it, and which will be presented for trial when the time arrives.

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We consider these examples worthy of being followed up by those who have the means. In what way can money be more worthily bestowed, and from which more useful and practical results be more likely to follow? The Executive Committee will take great pleasure in carrying out to the best of their ability any experiments that may be calculated to advance the interests of Agriculture in any of its departments.

Sixteenth Annual Fair.—This anniversary was held at the village of Watertown, in the county of Jefferson, on the 30th of September, and on the 1st, 2d and 3d of October, and although the weather was most unpropitious, the exhibition was creditable to the State in every department. The people of the north came in with an enthusiasm that surmounted all obstacles, and it cannot be doubted but that the exhibition has left its valuable examples, the results of which will for many years be felt for great good in that section of the State—a section whose inestimable worth, as part of what may be in truth designated as an empire, cannot be overestimated. The display of stock was among the best shown at our fairs, and was of an extent seldom if ever reached at former exhibitions. Gentlemen who appreciate that there belongs of right to this State the excellence of every breed of animals; that New-York has need of all the best blood, and that its farmers have the sagacity to choose and the skill to keep—these gentlemen sent choice specimens of the animals their good judgment selected, and thus there were gathered at Watertown such superb varieties of stock as indicate the coming superiority of this country.

The Society record with great pleasure the visit to the fair of the Governor of the State. It is to the wise action of the authorities that the Society owes much of its power to be useful; and it is gratifying when the chief magistrate is present, personally to witness the efficient and enlightened manner in which the aid of the State is distributed to the prosperity of the farmer and the advancement of the farm.

The contiguity of the provinces brought to the fair a large and warmly welcomed delegation of Canadian gentlemen in all the arts of life; in the pursuit of the things that tend to the happiness of the laborer in whatever department he does his work, all geographical lines throughout the Earth are obliterating; the com-

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munity of men is becoming a brotherhood of active, zealous, ingenious workers to give to the hand of industry an easier labor and a surer reward. The rapid development of the Canadas causes its citizens to be intensely awake to whatever is to advance their agricultural interests.

The press made active record of the incidents of the exhibition during its progress, and the delineation thus furnished found its way through all parts of the Union; the telegraph picturing before the planter of Louisiana every movement of the farmer of New-York at his great annual festival.

In machinery the record of each year is one of astonishing progress. Already our people, overleaping the barriers of precedent and doubt, so formidable in other lands, are testing every form and combination of the wheel, the lever, the cog, to furnish a power by which the land can be prepared, tilled, reaped, harvested, forests felled; and step by step; in rapid movement, the inventor is achieving his desire, performing his work, receiving his reward. Many new machines were shown at this fair, and the Society saw in them the certain indication of other conquests over forest and field. The history of Agricultural machinery is a history bearing faithful record to the good wrought out by the State Agricultural Society.

The labors of the fair were cheerfully performed, its general oversight committed to a greatly valued and long cherished friend of the society, was in that order which it was precisely in his habit to administer, and the citizens of Watertown generally deserve, as they have received, the high commendation of their fellow citizens everywhere, for their enterprising arrangements of the Annual Fair which belonged to them. Floral Hall would have been radiant with all the countless treasures of the rich gardens of the vicinity but for the ravages of the storm, still that which remained was in itself sufficient to indicate that a gentle and a pleasant taste had won place for itself at the north, in a degree rivaling the exhibition of other sections of the State, more genial in temperature. When the weather meliorated, the scenes in the vast arena were animated, and the people in movement from hall to hall, dispersed in admiring observation of the stock, was the type of what all the days would have presented if the rain cloud had sooner passed away.

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The Annual Fair of the Society is always an occurrence of the greatest interest; it developes progress—it is a landmark from which successive onward movements are made. The Fair just passed has developed, to the judgment of the close observing, the firmness of the tenure by which the Society holds the confidence of the people, whose representative it is, and the laborious but grateful duty of bringing to the aid of the cultivator of the earth, whatever of encouragement or improvement the State can furnish. Amidst all the untoward circumstances, the enthusiasm, the right-hearty good will was present, and the people of the north discharged their duties well, and showed that to all parts of the State the Society was welcome. To progress, the society devotes itself so encouraged, to place the Agriculture of New-York in the first rank—to place in its pastures and in its service the best stock—to raise from its fields the richest harvests—to make its farmers' home the happiest, and its farmers the most intelligent. Such are the duties which it proceeds to fulfil.

The address before the Society was delivered by the Hon. Wm. Jessup, of Montrose, Penn., on "The moral grandeur and dignity of Agricultural labor," and was every way worthy of its distinguished author. It was listened to by a large and attentive audience, and was published by the Society in pamphlet form, and widely distributed throughout the State. Its seasonable truths will exert a most salutary influence thoughout the farming interest of the State.

The report of the treasurer shows that the receipts from all sources have been $17,977.99; and the expenditures $18,933.06. Of the above amount, the sum paid for the completion of the rooms, for the salary of the Entomologist, and for rent of rooms to store articles during the rebuilding of the hall, which are provided for in the bill before the Legislature, amounting to $4,595.77, when received, will leave a balance in the treasury, after paying all claims, of $1,140.70.

B. P. JOHNSON,
Cor'g Secretary.

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ADDRESS

BY THE HON. WILLIAM JESSUP, OF MONTROSE, PENN., BEFORE THE NEW-YORK STATE AGRICULTURAL SOCIETY, AT WATERTOWN, OCTOBER 3D, 1856.

MR. PRESIDENT, AND LADIES AND GENTLEMEN,

Of the New-York State Agricultural Society:

In compliance with the invitation of your committee, I appear before you to pronounce your annual address.

Looking at the distinguished character and preeminent abilities of those who in several successive years have preceded me in the discharge of this duty, and the high character of their addresses, the broad scope and full discussion they have given to most topics seemingly proper for such occasions, it might well become so humble an individual to decline this honor. But my apology must be found in my love and veneration for the great cause of agriculture, and a desire to add my poor mite to its onward progress and steady advancement.

In this desire I bring a few suggestions which may serve to fill that space in your interesting exercises usually allotted to this object.

For a little more than a century our national progress has been so rapid, as to leave us and those who preceded us, no stopping place, no apparent quiet and calm, in which there could be a gathering up of the rich profusions which have surrounded us; and a consolidation, so to speak, of the elements which constitute our greatness. They all lie strewn along our pathway—scattered everywhere—and in the disarranged and disordered state in which we pass by them in our rapid progress, most truly and fully bear their testimony to our national greatness.

We are yet in a giant infancy; our institutions are shaped and molded by influences which have never seen a parallel in the history of Earth. Far removed by the wide intervention of the Atlantic from the corrupt and corrupting influences of the Old

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World, we have been enabled to discard many of their maxims, and to adopt a course of policy, civil and political, tending essentially to equality. We have discarded the laws of primogeniture, so that few estates can largely accumulate, and as matter of fact, most large estates are divided and partitioned in the second or third generation.

We have abolished all aristocratic titles and orders, and opened all the honors that can be conferred by the government, to a fair competition of all the people. We boast that one American citizen stands upon the same platform with every other. We invite all of every land and of every clime, to come and participate with us in the blessings of liberty and equality. We welcome them to our shores, and offer them protection and a home.

In this our nation's youth, we afford an asylum for the oppressed, a refuge from tyranny, and more than all, a sure reward for industry and frugality. Our arms are open to receive honest labor, come from whatever place it may.

A retrospect of the brief years since our fathers landed on this

"Rock bound coast,"

fills the mind with wonder. That which has been accomplished, seems, as we look back upon it, "as a dream when one awaketh."

Where are the mighty forests which so recently covered the largest and fairest portions of your great State?

Where are those trees which in all their primitive grandeur spread their branches in an unbroken shade from the Hudson to Lake Erie?

They are gone—the ceaseless hands of industry have shorn them of their evergreen mantle, their timbers, wrought into the ground work of a world-wide commerce, bear proudly to the breeze the flags of every nation. The desolate moan of the forest pine has given way to the lowing of cattle and the busy hum of mechanical and agricultural labor. Cities and villages and fertile fields occupy their places, and industry in its varied forms of interest and enjoyment diffuses happiness through millions of hearts.

Were these forests in their majestic silence grand? Is this civilization which sheds its hallowed influence over this, so late a wilderness, grand? Is this magic touch, which has in such brief space, called into existence your cities and towns, and canals, and

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railroads, and filled all with plenty for their thronging millions—is this grand?

How much grander then, is the contemplation of that *Free Labor* which has produced them all! that well requited and paid industry, without which none of these things *had been*, or *being*, had been a blot and a stain upon them all.

The moral grandeur and dignity of agricultural labor is in part my theme.

I refer not here to those labor-saving machines which so well subserve the cause of agriculture, and give character and honor to our age. They claim a meed of praise on every suitable occasion. Their influence is everywhere felt and acknowledged. They are rapidly hastening us along in the road to national wealth, and promise to make us the *granary of the world.*

But they did not fell the forests—they did not roll the logs; the wilderness could only be assailed single handed, and nothing but the axe and fire-brand of the pioneer was adequate to its destruction.

Who has not seen him, as solitary in his own self-reliance, he walks into the heart of the forest, builds his bark cabin, far removed from roads, from neighbors, from all the comforts and refinements of life, from social privileges and enjoyments, and there, axe in hand, commencing his attacks upon that forest in expectation of making it "to bud and blossom as the rose."

Who that has considered the labor and toil, the self-denial and perseverance necessary to subdue that forest, has not given "the honor to valor due"—to that pioneer of civilization?

And who, when after a few years have passed, has seen in place of that forest, the broad fields of luxuriant harvests, the cities, the churches, the luxuries of life, the dense and teeming population, the canals, the railroads, and all the appliances of the civilization of the nineteenth century, has not bowed in homage to the dignity of human labor.

The individual man who wields the axe and fire-brand, clearing the way for all of health and happiness which follow in his train, is the pioneer hero of agricultural labor, and whenever seen is worthy of high regard for his work's sake.

So too, all that great class of men, who, leaving the comforts of home, go forth as explorers and settlers in new fields, whether of

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forest or of prairie, are worthy of regard and respect. They are men who enlarge and extend the boundaries of human effort, and make homes for themselves and others, where but for their labor all would be unbroken wilderness.

Thus we view *agricultural labor* in its individual character and influence, as *honorable* and *dignified;* and without regard to the personal condition of the laborer, claim for it the respect always due to meritorious and successful enterprise. But there are other considerations which still more tend to enhance our estimate of the importance of agricultural labor.

And first—The numbers engaged therein, their character, standing and influence.

By the census of 1850, of 880,000 males nearly one half are farmers by their profession, or engaged in pursuits directly connected with Agriculture. This State is a fair representative of all the Free States, some having a larger and some a smaller proportion of farmers.

This great disproportion of the engagements of the male population in favor of Agriculture, gives at once the true estimate which is, and of right ought to be placed upon this species of labor. Its interest is greatly enhanced by the consideration, also, of its great value, surpassing all others in incalculable ratios, lying at the foundation of all other enterprises, and being the basis of all the wealth of the world.

To serve its interests we have drawn from the millions of Europe, and filled our land with canals and railroads—these monuments of the real greatness of the first half of the nineteenth century. We have covered our rivers, seas and oceans with ships, and in a word, every enterprise of man rests upon Agriculture as its sure basis.

I only repeat what is universally conceded, and in the concession of which no invidious comparison is intended—that the farmers of the country, as a body, greatly excel any other class, in the exercise of all those virtues which adorn and elevate man. No more pleasant picture can be presented to the mind, than is every day to be seen in our rural districts.

I have in mind such a view upon one of the slopes which bounds a beautiful lake in your State—farms of about one hun-

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dred acres—an area of about five miles square—near the center, the church, the mechanic shops, the house kept for the public hospitality, the neat school house, and a few stores constitute the village. The roads are well constructed. The farms are in a high state of cultivation, and all the scene at once gives evidence of honest and well rewarded industry, of high moral worth, and of the dignity of Agricultural labor.

These scenes are everywhere to be found. The beautiful valleys of Pennsylvania present the same delightful vision; and both only compete with the fertile plains of Ohio and the west, and the more rough, but more highly cultivated fields of the north and east.

Mr. President—We cannot fix too high a value upon *personal labor*, nor study too much to elevate it. It is not aspersed except by inference, but *some inferences* in our day have such a tendency to degrade personal labor that they need to be resisted.

I never can consent that the non-producing class shall claim in any respect a superiority over those who rise in the morning of every day to daily toil, "who work, laboring with their own hands"—and these give to every other class support and sustenance. "The laborer is worthy of his hire," and in this country whose civil, political and social institutions are based upon principles of equality, of regard to the just rights of all, it becomes public duty that he be not only rewarded for that labor, but that he receive all that consideration, to which his most meritorious avocation shall entitle him. By what process shall labor be saved in the estimation of the world from a degree of obloquy which is sometimes attempted to be fastened upon it?

There is a supposed elevation of the man who lives without labor, over him who toils; as a consequence many of our young men flee from the farm to the counter, and to the professions, and too frequently fail of success.

Had they been contented in their fathers' most honorable vocation, certain success would have attended their efforts, and they have lived an honored and useful life. False notions upon the subject of the true elevation of farm labor destroyed them. Such cases are to be found everywhere, and the evil in some sort needs

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a remedy. Such remedy in part is to be found *here*, in *this circle*, at this fair. The tendency of every thing here is to bring out in prominence this grand feature of all our arguments in favor of personal labor—to give it a *distinct* prominence.

This great gathering of the farmers of this great State in itself dignifies and elevates the labor of which it is but the exponent. The county societies, in their fairs, their discussions, and their addresses tend to the same point. It is most gratifying to know that the influence of these associations has uniformly had this tendency, and that a great change in this particular is clearly discernible, where these means have been successfully applied. The notion that agricultural pursuits were not suited to mental acquirements —that an educated farmer was likely to be an unsuccessful one, and that if a man knew how to hold his plow and reap his grain, he had all that knowledge which a farmer need to have, is already exploded. The associations of farmers, multiplied as they are in all parts of the land, have done much, very much, to correct this false view, and to give in its place the conviction *that farmers of right ought to be and must be educated.* When this principle shall be fully carried out, we shall have the dignity of farm labor truly vindicated.

This question thus necessarily runs into the subject not only of education in our common and higher schools, but of introducing into these schools many of the simple elements of agricultural science, making them, for the sons and daughters of our farmers, the preparatory schools for those higher institutions now being established in many of the States, and which must find, at no remote period, a support in every free State. Having already adverted to the great preponderance of the agricultural class in numbers, it necessarily follows that in all rural districts, the schools are filled with those who are to be engaged in the same business for their lives. There is a large field for agricultural science which may be cultivated to advantage in the common schools. Many text books are at hand, and the farmers of the country have but to make the demand in earnest, and teachers qualified to impart instruction in the science of agriculture will be found to fill up that demand. By this means interest will be given to every department of education, and while the mind is impressible and open to right convictions. it will be filled with

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useful knowledge and with correct views of the farmer's life and avocation, or, as it may very properly be styled, "*The Profession of Agriculture.*"

Nor can the education of the farmer be limited by any such bounds as these. As a class they are reaching far beyond this, and are already demanding a more perfect and enlarged system of education. They press upon the public attention their claims to an elevated and expanded system. They demand the erection and endowment of the farmers' high school—and will continue to demand it until the object is attained,—and until all which art and skill, inventive genius and science can impart, shall be concentrated in such schools, and thus made accessible to the young men of all parts of the land. Nor are these schools to be the resort of those alone who expect to be directors of the labor of others, and managers of large estates. The prevalence of such a sentiment would work their ruin. They are to educate the men who are to hold the plow in their own fields, and to give to working farmers all the intelligence, knowledge and science which are requisite, not only to the proper direction of all farming operations, but if need be, to direct and guide the affairs of state, when, by the call of their country, that duty shall be laid upon them.

Mr. President—Political discussions cannot be introduced here, but I shall not trench upon forbidden ground when I affirm, that farmers have not been sufficiently numerous in the councils of the State or nation.

We need more of their sound minds and matured judgments and calm conservatism in our public councils. They are the hope and reliance of the nation in all times of trial, and in all great exigencies.

And are they to receive all the needed qualifications in their own sphere, for the discharge of their high duties? I am sure, Mr. President, that this society has but an affirmative response to give to this inquiry.

The higher grades of instruction must necessarily be provided, not in stinted and measured, and in few and poorly endowed schools —they must bear some proportion to the number, character and wealth of those for whom they are designed. They must sustain and elevate the character of the class for whose benefit they are provided. If we take any pattern from the training in

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other seminaries, we shall have an enlarged system of education, for the mind and for the body. We shall cultivate both together, and having all the appliances for that cultivation, we shall expect them to produce their desired results. It will be in vain to look for the accomplishment of this object from ordinary operations in similar cases.

The aid of the State is to be invoked, and all that is necessary to give permanence and efficiency to the institution should be provided from the public treasury.

The laboring classes sustain all others. The fruit of their toil is the wealth of the nation. Our commerce—our manufactories are equally dependent upon them.

They may truly be termed the life blood of the nation. Is the vital fluid in a healthy condition—the whole body is full of life. Is it corrupted—the whole body is covered with ulcers and ready for decay. Can that which is thus vital be degraded, and yet the interest dependent thereon not be affected? It is impossible.

The future of our nation, it is difficult to predict. There are from time to time complications in the body politic, which for the moment seem threatening, but they disappear with the occasion which gave them birth. And so must it be while the masses of our farmers are well instructed, not only in their pure, elevating and noble profession, but in all their duties as American citizens.

May I be permitted to congratulate this society upon their progress and success in the establishment of their Agricultural College—upon its location in one of those fairy spots of which there are so many in this State, and upon the prospects opening before them for its usefulness, and may I be permitted to suggest that it will for a long time require fostering support, and a generous and liberal patronage. These, I doubt not, it will receive, and that its blessings will be largely felt and fully appreciated by the citizens of this great State.

It is gratifying to me, also to state, that Pennsylvania intends to compete with New-York for the honor of the best endowed and most beneficial farmer's school.

She too is advancing rapidly in her preparation for giving dignity and honor to farm labor. With these two great States going side by side, in this noble work, what may not be hoped for? In vain

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will the influences which tend to degrade labor attempt to pass these boundaries.

This "*Cordon Sanitaire*" can not be passed by any feeling, which, degrading labor, necessarily degrades man. I have confined this view of the subject to farm labor, but it is not necessarily thus confined.

The system of education adapted to farmers, will, with little exception, be adapted to the wants of mechanics and artizans.

The practical in education will form the basis. That which instructs in arts and in *science* in its most extended sense, will necessarily be furnished, and the artizan equally with the farmer needs that education.

I am no advocate for making the work-shop a college, and of apprenticing in that college those who are to be practical handicrafts-men of our country, but it would be rank injustice to exclude them from that education, which a liberal government should provide equally for all.

The avenue should be opened broad and wide, and then all who choose may enter.

I have already suggested, that farmers ought to be more frequently in our national and State councils, and yet their habitual diffidence, their love of home, and their aversion to political life, are very likely to keep them in retirement. But at home they hold the control of the government, and they have only to draw their check on the public treasury and it would not be protested.

If your college needs a hundred thousand dollars to begin with, your farmers have but to order the money appropriated and it will be found. Let your Society and the County Societies but once earnestly take the matter in hand, and it will easily be accomplished.

To whom do your State funds belong? Who pay your taxes? Who are the most numerous class in your State? And I may enquire, who have been the last to be served in their great interests from the public treasury?

The response is at once at hand. And will this state of things continue. Farmers must answer NO!

Mr. President, the problem in self-government which this nation is now working out, is not yet entirely solved. We have, in comparison with other nations of the earth, barely entered upon

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our existence; and although we were strong at our birth, and our early youth gives evidence of great power and vigor; yet looking with a proper sense of the instruction to be derived from the history of other nations, we can write no future for ourselves; our course is, to a great extent, untried; we came into existence upon great principles, and we must stand and be built *up* upon such principles, or we must fall; we rely upon the patriotic intelligence of the masses. The laboring classes do, and ever must form these masses. To give them a clear and intelligent view of their rights, of their privileges and immunities is to give permanence and stability to our institutions, and to prepare us for a perpetuity of those rights, which shall be a blessing to all "the dwellers on earth."

I shall in this connection be pardoned for saying, that any system of government which disparages the producing classes, must in the end be bad government. It will necessarily contain elements of corruption and dissolution. I need not go farther on this point than thus to state the question, for I am sure of a hearty response to the position that for this nation the true policy of patriotism is to create and multiply intelligent, well educated laborers.

I have adverted to the influence exerted by the fairs of this and kindred societies, but I have not referred to the greatest and most effectual instrument for elevating labor which is now, or hereafter can be called into operation.

Our *agricultural newspapers* and *magazines* reach numbers and produce effects which are unequaled. Their literary character is alike creditable to their conductors and to the farmers by whom they are read. The great benefits flowing from their extended circulation, is not confined to the improvements in agriculture, which are a sure concomitant of their perusal. They create and inspire a taste for reading, enlarge the sphere of observation, and educate in literature and science a large class who are inaccessible to other influences. They have already taken a high place among the scientific and literary periodicals of the day, and may very favorably challenge a comparison with them. They are worthy of most extended patronage. Their evident effect is to elevate the character of labor.

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Whoever passes through the agricultural portion of the Eastern and Middle States will be struck with the equal distribution of property.

Few large estates can be found—comparatively few farms rented. Most farms are worked by their owners, and the mass of those owners are the educated farmers of the country. Some agricultural paper is to be found in almost every house. Its appearance is welcomed as weekly, or monthly, it is delivered.

A sense of degradation in labor finds none of its humiliating accompaniments where the well conducted farm journal is regularly perused. The demand for a Quarterly Agricultural Review of the high order of the best scientific and literary reviews of this country and Europe, may not be a pressing necessity at this moment; but may we not expect such a periodical as soon as our colleges are founded, our professorships filled and endowed?

There is certainly a field to be occupied by such a periodical, not in place of any we now have, not excluding one of our farm journals, nor in any way interfering with their circulation; but occupying a higher sphere, and increasing the influence and beneficial effects of all.

Mr. President—I doubt not that our agricultural journals have added millions to our national wealth; and at the same time they have been productive of happiness and enjoyment in the farmer's family, giving contentment to his sons and daughters, and a relish for labor which is beyond all price.

Concluding this somewhat desultory address, I may be permitted briefly to allude to the agricultural interests of our nation, as connected with the administrative portion of the government. Our National Society is a noble institution, doing a vast work, bringing into happy juxta position, the varied interests of the nation.

And without in detail pointing out its prospects for good to the whole nation, as your society is blessing the State, I wish to commend its approaching exhibition of next week, at Philadelphia, as worthy the patronage of all. But what place has the great agricultural interests of the nation in the government? Transcending all other interests, furnishing a vast majority of all our exports, giving character and influence to our commerce, we have

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a trifling yearly appropriation for the purchase of seeds, &c., and an insignificant place in a subordinate division of one of our departments.

A department of agriculture, with a vigilant head, whose whole duties are devoted to a consideration of this subject, is demanded alike by the magnitude of the pecuniary interests involved, and the number of those employed in the prosecution of those interests.

There are a variety of legislative enactments which need constantly this supervision, and in the details of which there should be constant reference to facts which ought to be collated and prepared for use in such department.

Scarce a treaty of commerce is made in which agricultural interests are not involved, and for the want of such accurate and careful knowledge as can only be acquired by continual research and study, those interests it is believed in some cases have been sacrificed, and in others have not been so advanced as they might have been. I would not be understood as disparaging in the least, the work which has been done through the Patent Office for the introduction of choice seeds and plants, and the collecting and diffusing of varied and important experience and knowledge. I appreciate it most fully, and in common with my brother farmers, am grateful for it.

But what is the influence of American Agriculture upon the commerce of the world? Where can a better provision be made for its extension? What reciprocity treaties can be made with other nations opening a market for our surplus? What present restrictions can be removed or compensated for by removing similar restrictions from the products of the country imposing them?

These are questions only to be answered by a mind devoted to this one subject at home and abroad, and which will have the responsibility of these great interests laid upon it. A voice in the treaty making power is demanded by larger considerations than I have suggested. It may be alleged that all departments of the government are interested in this great subject, and that being regarded as the most important of all the subjects of legislation and protection, it is always cared for. I only answer that the old maxim is applicable in its full force, "that what is every body's business is nobody's business."

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It will be vain to object that it will increase the expense of the government, or that it will complicate the administration and add to the numbers of the cabinet. The farmers furnish the money, and instead of complicating and confusing, it will relieve the department of the Interior, still leaving in that department enough to occupy the mind and employ the energies of any ordinary man. No valid objection can be urged against the establishment of such a department, and it is only necessary that the united voices of our farmers shall be heard in Washington to produce this very important end. Some time since, when this subject was discussed at a meeting of the National Society, it was objected that the department of Agriculture would necessarily be filled by a *politician*, as were the other branches of government, and that the interests of agriculture would thereby greatly suffer. This objection was urged by an influential senator, but although the source of the objection was high, the objection itself has no validity. In all the parties into which the country has ever been divided, there have been found well-qualified, patriotic men, who would command the confidence of the community, and who would devote to the objects of their office, all the requisite talent, industry and skill, and it is not true, that because they might belong to one or another party they would fail in fidelity to the duties required of them.

With agricultural contributions to the wealth of nations of more than fifteen hundred millions of dollars per year, the interests of which blend with every other interest of the world, it is not asking too much to demand a department of agriculture, as an obligation of government, as a right the granting of which is not longer to be deferred.

Mr. President and Gentlemen—The cause of agricultural labor is the cause of our common humanity. The onward progress of civilization, of arts, of science, and of all that elevates and adorns society, essentially depend upon its character and the estimate in which it is held. In all the Free States, it sends its contributions of members and influence to every avocation and profession. It claims support. It demands honor. It is to be protected and defended against all assaults, either from an aristocratic pride and feeling at home, or from degrading servile influences from abroad. Its fruits of industry require the protecting,

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fostering and expanding care of the government. Its hardy youth demand all those appliances of education which shall amply qualify them for fulfilling their duties as farmers and carrying out their obligations as American citizens; and our mission—the mission of this and affiliated societies, will not be ended until these objects are accomplished.

The thanks of the Society were tendered to the speaker, on motion of Hon. John A. King, and a copy of the address solicited for publication in the Transactions of the Society.

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NEW-YORK STATE AGRICULTURAL SOCIETY.

ANNUAL MEETING.

WEDNESDAY, *February* 11, 1857.

At 12 o'clock, the Society being met in annual meeting, in the Assembly Chamber, were called to order by THEODORE S. FAXTON, President.

The Secretary read an abstract of the report of the Treasurer:

Feb. 1856. RECEIPTS.

Balance in treasury,	$2,743 69
From members at annual meeting,	323 00
Premium returned,	4 00
From State,	700 00
Receipts at fair, Watertown,	8,010 00
Rent of grounds,	200 00
Horace Greeley for premiums offered,	100 00
Watertown, part payment of expenses,	500 00
Notes discounted,	5,397 30
	$17,977 99

Feb. 1856. EXPENDITURES.

Expenses, Winter meeting,	$80 51
Premiums at fair at Elmira	216 38
do Winter meeting,	677 50
Library, books and binding,	163 94
Postage,	194 75
Dr. Fitch, Entomologist,	1,050 00
Incidental expenses,	990 33
Printing and advertising,	194 07
Salaries assistants, &c.,	2,202 70
Amount carried forward,	$

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Amount brought forward,.....$	
Superintendents and gate-keepers at fair,.....	582 25
Miscellaneous expenses of fair,.....	1,213 27
Clerks and assistants at fair,.....	505 50
Premiums paid at Watertown,.....	4,366 09
For completing Agricultural rooms,.....	3,495 77
Notes paid,.....	3,000 00
	$18,933 06
Treasury in advance,.....	$955 07
Appropriations in Supply bill for moneys advanced to complete rooms, salary of Entomologist, &c,.	4,595 77
Which when received, will leave a balance in treasury, of.....	$1,140 70

The report of the Executive Committee was then read by the Secretary; and on motion of Hon. T. I. Chatfield was adopted.

On motion of George Clarke, Esq., the rules of the House of Assembly were adopted, for the government of the deliberations of the meeting.

On motion of Hon. T. C. Peters,

Resolved. That no person be permitted to speak more than once, and longer than five minutes, upon the same subject, without permission of the Society

Mr. Clarke called for the consideration of the following proposed amendment to the Constitution, of which notice was given at the last annual meeting:

"Section 5th. The Society shall, at its annual meeting in 1857, permanently designate one, two or three places, as a majority of said meeting may elect, for holding, in future, the annual fairs or exhibitions of said Society,"

And sustained his motion in some appropriate remarks.

Mr. Burroughs opposed the proposition: It would be unwise, impolitic and unjust. He trusted the motion would, to-day, receive its death-blow.

Mr. Clarke was willing to have the matter now definitely settled. He wished to have the points selected, Albany, Syracuse and Buffalo.

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Mr. Richardson moved the amendment he proposed last year, viz: the selection of three places, in separate judicial districts—each place to be permanent after selection, &c.

Mr. Cheever wished the vote taken directly on the first proposition. He was opposed to changing the settled and successful policy of the Society.

Mr. Randall had once been in favor of permanent location; but he was not now. It would be hazardous to make the experiment. If there were occasional deficiencies, they could be easily made up.

Mr. J. B. Nott opposed the proposition to amend for various reasons.

Mr. A. B. Dickinson also opposed the proposition; as did also Messrs. L. F. Allen, Peters and Hall.

When the vote being taken, on a call of the roll of members, there were, for the amendment, 20; against the amendment, 132.

On motion of the Hon. Wm. Kelly, the usual resolution for the appointment of a committee to recommend the place for the next fair; and also to nominate officers of the Society, was adopted, and the following committee was selected:

First District—Simeon Draper, P. L. Benedict, James Hogg.
Second—W. T. McCoun, A. P. Cummings, W. Kelly.
Third—Wm. Newcomb, Herman Wendell, John T. Hogeboom.
Fourth—Samuel Cheever, H. W. Beckwith, B. C. Butler.
Fifth—Leonard Ames, Nathan Randall, Ela Newman.
Sixth—Chas. Morrell, F. M. Rotch, George Clarke.
Seventh—D. H. Bissell, J. W. Bacon, Martin Holmes.
Eighth—Lewis F. Allen, P. Dorsheimer, S. M. Burroughs.

The committee under the above resolution was then appointed, and a recess was taken to four o'clock, P. M.

FOUR O'CLOCK, P. M.

The Society reassembled, and the Hon. W. T. McCoun, as chairman of the committee of twenty-four, made the following report: recommending to the Executive Committee, Buffalo for the place of holding the next Fair—and the following list of officers:

President—ALONZO S. UPHAM, Genesee.

Vice-Presidents—1st district, Jonathan Thorne, New-York; 2d district, Hon. W. T. McCoun, Queens; 3d district, Herman Wendell, Albany; 4th district, John M. Stevenson, Washington;

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5th district, B. E. Bowen, Oswego; 6th district, Francis M. Rotch, Otsego; 7th district, Willard Hodges, Monroe; 8th district, Lewis F. Allen, Erie.

Corresponding Secretary—B. P. Johnson, Albany.

Recording Secretary—E. Corning, jr., Albany.

Treasurer—B. B. Kirtland, Albany.

Executive Committee—C. S. Wainwright, Dutchess; Solon D. Hungerford, Jefferson; E. C. Dibble, Genesee; G. W. Tifft, Erie; Charles Morrell, Tompkins.

Mr. Grove Lawrence moved to amend the report, so as to substitute Syracuse for Buffalo, as the place for holding the Annual Fair.

Hon. Mr. Wadsworth opposed the amendment, as did Mr. Randall of Syracuse.

The motion to amend was withdrawn, but renewed by Mr. Hovey.

Messrs. Hall, of Syracuse; Gen. Vielie, of Troy; Lewis F. Allen, of Erie; and Mr. Monroe, opposed the resolution, and the same was lost.

The report was then agreed to, and the officers named elected.

Lewis F. Allen of Erie, offered the following resolution:

Resolved, That it is against the original intent of the founders of both the State and County Societies, and the best interests of the Agricultural community, to tolerate or countenance any exhibition of horses for speed—giving them, thereby, undue advantage of other descriptions of stock; or to erect rings for the exhibition of horses, on the Annual Show Grounds of the Society, larger than one hundred and fifty feet in diameter.

A discussion arose upon the resolution, in which Judge Osborn, Mr. Williams, of Albany; Hon. Joel Turrell; Nathan Randall, Esq.; L. F. Allen; Mr. Hilton, of Albany; Mr. Davis, of Onondaga; Hon. Samuel Cheever; Hon. T. C. Peters; E. P. Prentice, Esq.; Hon. S. M. Burroughs, and Hon. A. B. Dickinson engaged, and the resolution was referred to the Executive Committee.

Recess to seven o'clock.

WEDNESDAY EVENING—7 O'CLOCK.

The Society convened at seven o'clock, to hear an address from Dr. Fitch, on the Insects of this country. The lecture was of absorbing interest, embodying a vast amount of practical information. It will be embodied in the Transactions.

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At the close of the address, on motion of Hon. T. C. Peters,

Resolved, That the Legislature be requested to continue the appropriation of $1,000, for the continuance of the Entomological Survey of the State, by Dr. Fitch, under the direction of the Society.

Hon. A. B. Dickinson, seconded the resolution, and showed the importance of the labors of Dr. Fitch by many examples, where his instructions had been carried out successfully. Mr. Dickinson also remarked, in this connexion, in regard to the Agricultural College—although originally opposed to it, now that it is established, it was the duty of every farmer to sustain it, and do all he can to make it successful. It was admirably located; in no part of the State could a farm have been selected with an equal variety of soils adapted to the purposes of the farm —excellent land for corn, wheat, &c.

The resolution was adopted.

An interesting discussion was had upon dwarf pears—in which Lewis F. Allen, Hon. A. B. Dickinson, George Clarke, Hon. T. C. Peters, and others engaged. Most of the gentlemen who spoke were opposed to the culture of dwarfs on the quince stock, for the ordinary farmer.

The Society took a recess until Thursday at 12 o'clock.

THURSDAY, 12 o'clock.

The Society met at the Agricultural Rooms, the President in the chair; and the reports of the Judges were read and premiums awarded.

Recess until 7 o'clock. P. M.

SEVEN O'CLOCK.

Society met in the Lecture Room of the Society, the President in the chair. His Excellency the Governor, the Lieut. Governor, State officers, members of the Senate and Assembly, Elihu Burritt, and other distinguished gentlemen were present, and a large number of the members of the Society.

The order of exercises was as follows:

DEDICATION OF THE AGRICULTURAL ROOMS—THURSDAY EVENING, FEBRUARY 12, 1857.

Prayer by Rev. Dr. Rogers, of Albany; Brief Statement of the Society's operations, by the Secretary; Address, by Hon. Samuel Cheever, President of the New-York State Ag-

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ricultural College; Address by Hon. Joel T. Headley, Secretary of State; Address by Hon. T. C. Peters, of Genesee; Remarks, by Hon. William Kelly, of the Senate, and His Excellency, John A. King; Address of the president, T. S. Faxton, Esq., and of Hon. A. S. Upham, President elect.

The several gentlemen named took part in the exercises, except Hon. Joel T. Headley, who was prevented, by sickness, from being present. Wm. H. Bogart, Esq., of Aurora, Cayuga county, supplied Mr. Headley's place, in some very well timed and appropriate remarks, made on the spur of the occasion.

The exercises were of a most interesting character, and will be found in full, post p. 41, &c

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ADDRESS

OF T. S. FAXTON, PRESIDENT OF THE SOCIETY, FEB'Y 11, 1857.

GENTLEMEN, *of the New-York State Agricultural Society:*

We are once more permitted to assemble together through the goodness and mercy of Him, "who doeth all things well"—and let us not forget our obligations and dependence on Him for the numerous blessings we receive as a people, highly favored in the enjoyment of peace, health and prosperity, both as a State and Nation.

The past season has been one of great prosperity, and our Nation has been highly blessed. While others have been engaged in wars and visited with pestilence, our country has escaped their ravages; our farming, manufacturing and commercial prosperity has been most gratifying. When I look around me and consider the high position we occupy as a Society, aud the success which has attended it from its conception, and remember the eloquent words that have dropped from the lips of those who have preceded me, I am almost constrained to withhold any remarks further than to thank you for the partiality and kindness with which you have sustained me in my duties the past year.

Our Sixteenth Annual Fair.—This anniversary, now one of the most distinguished and most welcome of the occurrences of the year, was held at the village of Watertown in the county of Jefferson, on the thirtieth of September, and first, second and third of October, and came amidst all the discouragements of a succession of stormy hours, unexampled in the annals of the Society; still it indicated to the attentive observer, the strongest assurances of the earnest and vigorous position occupied by the agricultural interests of the State. No one could have seen the occurrences of these days, but must have been convinced that the attention of the people is concentrated on the movements of the State Society with unequivocal marks of favor; and that all its undertakings

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in the promotion of the cause with which it is now everywhere identified, are recognized as connected directly with the greatest happiness to the greatest number. The Fair at Watertown was behind former fairs, only so far as a continued, remarkable storm could operate in embarrassing the movements of the people.

As the Fair of 1855 was at the call of the people, held at Elmira, one of those creations of the internal improvement system in the southern frontier of the State—so was the Fair of 1856, at a call not to be disregarded, placed at Watertown, a village in its industry, its wealth, its active manufactories, and its general prosperity, evincing what an extent of business and population it was the good fortune of this State to possess as well upon its northern frontier as upon its southern border. The citizens of Watertown, at whose invitation the farmers of New-York assembled, had fully and liberally made all the preparations enjoined by those wise regulations, which the Society, from its experience of many years has instituted.

The area was capacious and thoroughly guarded; itself an object of interest in that fertile and richly watered valley. The buildings were of strength of structure, the usefulness of which was every hour proved, and former fairs have failed to exhibit ground better chosen or arranged. The accommodations for the stock were such as to give that valuable property the best opportunity to display their highest qualities; and the space set apart for their exhibition was ample and wisely arranged.

The fixtures for the display of machinery which is acting a part so important, as science advances in the farmers' labor, were of unusual importance; the steam pipes so prominent on the ground were the significant indications of the near approaching and complete adoption by the Farmer of all the powers of the Machinist to aid in the culture—the thorough and well rewarded tillage of the earth.

The Fair grounds were complete; the arrangements had been made with the well judged expectation that the farmers of the State would visit any and every locality of their fellow farmers —inasmuch as the sphere of duty of the State Society was over all the State, and every incident proved that only the peculiar inclemency of the weather prevented the gathering of thousands; notwithstanding the storm, whose severity was marked throughout

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the State, the farmers of the other parts of the State did not forget their brethren of the North.

There assembled at Watertown a large number from all quarters, of those old, long-tried and cherished friends of the Society, whose attachments for the good cause, and sympathy with it, have grown with its growth and strengthened with its strength. The people of the north came in crowds, and the exhibition, which as a whole, has not been excelled, has left an impress upon the farmers of the north which will not be lost.

The show of Stock was remarkably good, and in some departments never equalled. The display of horses, as was expected, was of a very high order. Sheep and swine were exhibited in large numbers, and of remarkable excellence. The machinery and implement department excelled any previous exhibition, and new machinery of very great promise for the farmer was shown. The dairy department, was of superior excellence, surpassing in extent any previous fair, and showed a creditable advance in quality. The ladies' department, notwithstanding the unfavorable weather, was well filled with useful and attractive articles.

The last two days of the fair, when the weather became favorable, exhibited a most gratifying spectacle; at least twenty-five thousand persons were present each day, and showed what would have been our success if the whole four days had been pleasant.

Our receipts were lessened by the severe rains, and unpleasantness, and consequent interruption of public and private conveyances, as judged by the receipts of the two last days, by more than four thousand dollars. This loss, however, ought not to be attributed to the location, nor to any lack in the facilities provided by our friends of Jefferson county.

This, gentlemen, in connection with the reports which have been read to you, will, I hope, show clearly the results of our labor for the year; and that the succeeding one may be one of still greater success and prosperity, is my most earnest wish.

The Agricultural Interests—I do not propose to give you a dissertation on practical farming. So much has already been said on the subject, that anything which I might offer, would be of but little value to the practical farmer. What I want is to see the farmers of this great State place themselves where they pro-

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perly belong, and knowing their rights, maintain them. The agricultural interests of this State are very great and constantly increasing, and when we take into consideration the vastness of our territory, and the varied productions of our soil, we cannot fail to realize that the efforts of this Society have been productive of great good; and when we further consider the great amount of wealth and income of our farmers, we cannot but feel that they are entitled to more consideration from our Legislature, than they have hitherto been able to acquire. True, our Legislature has been prevailed upon, after long and persevering importunity, to open the purse strings of the State Treasury so far as to appropriate $40,000 towards the purchase of a farm and erecting an Agricultural College, for the purpose of experimenting and educating our young men for practical farmers, provided an equal amount was raised by private subscription for the same purpose. True, there has been paid out of the State Treasury the sum of about $8,000 per year for the promotion of agriculture, which has been distributed among the counties in which the societies had raised a like sum to be paid out for premiums. Of this amount the State Society has received $700 yearly.

One whose wisdom and sagacity has never been doubted, George Washington, has said, "That with reference either to individual or national welfare, Agriculture was of primary importance. Institutions for promoting it grow up supported by the public purse, and to what object can it be dedicated with greater propriety? Among the means which have been employed to this end, none have been attended with greater success than the establishment of Boards, composed of proper persons, charged with collecting and distributing information, and enabled by premiums to encourage and assist a spirit of discovery and improvement, by stimulating to enterprise and experiment, and by drawing to a common center the results everywhere of individual skill and operation, and by spreading through them over the whole nation. Experience has accordingly shown that they are very cheap instruments of immense national benefit."

Our State Society is allowed to be put up at auction, to be located for the year at such place or point as the parties present at our annual winter meetings shall direct. Now this may have been very well for the time when it was considered as

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an experiment whether the Society could be sustained, or be of any practical benefit to the Agricultural interests of the State. But, gentlemen, it seems to me that that day has gone by, and it is time that this Society took its position as an institution of the Empire State, and received, as it deserves, the fostering care of our State government more liberally than it has heretofore. Not to be sent about the State and located where the highest bidders were found, regardless of the interests of the Society, or the State at large.

Why should not the farmers, who are actually the great producers of our wealth, and who pay a large share of the taxes, into the treasury of our State, be recognized as a portion of our citizens, and entitled to some consideration, and be permitted to share to a small extent its liberality with other public institutions? As has been well said by my predecessor:

"It is a fact so often stated that I need not repeat it again, that our Agricultural interest is the most important in the country. Next in the order of importance is our manufacturing interests. Without these, and the consumption of merchandize by those engaged in them, commerce would have but little to do.

"Statistics show an amount annually created by our Agriculture, greatly beyond that created by any other agency, if not more than by all others in the land. It creates, because it draws from the earth and from the atmosphere that which, but for it, would not be produced."

It is but little aid that our farmers desire, and it appears to me that the time has now arrived when the New-York State Agricultural Society should no longer be compelled yearly to seek for bidders for its location. Compelling different communities to be onerously taxed, for the privilege of having a State Fair located among them, when, of right, they should have it, and any expense which might be incurred over and above the receipts of the Society, should be paid by the State—holding the officers to a strict accountability for the faithful performance of their duties, and an honest expenditure of the funds entrusted to their care.

Let us look for a moment at some few statistics of our State.

The statistics of the commerce of the United States show that the State of New-York exported in 1853, over $66,000,000, while Mas-

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sachusetts, Pennsylvania, Maryland, Virginia, South Carolina, Georgia and Alabama were but about $70,000,000, thus showing most conclusively the superior advantages we possess over any other State in the Union as an agricultural, manufacturing and commercial State; and it should be borne in mind that not the least part of the above item is agriculture, and hence the justice of the claims which the farmers of our State have upon the treasury, to which they so largely contribute by their productions as well as taxes.

The citizens of New-York pay more taxes by over a million dollars, than those of any other State in the Union, and from what source are they derived? Most evidently a large proportion from the soil and by the sweat of the brow. The real estate of New-York, in 1854, amounted to $946,457,907, and the personal property to $221,802,950; and this amount is arrived at from its assessed taxable valuation, and it is hardly necessary for me to remark that these assessments do not show the full value of the property, falling short not much, if any, less than one-third of the actual value, which, if added would swell the amount to about $1,600,000,000, which is more than the assessed valuation of thirteen other States in 1852.

In 1853 the revenue collected for the port of New-York, was $38,289,341.58, while at all the other ports on the sea-board, they were less than $20,000,000.

In 1850, there were in the State of New-York 12,408,964 acres of improved lands, and 6,710,120 acres of unimproved land; average number of acres to each farm, 113. Cash value of farms was $554,000,000; while the value of farming implements was over $22,009,000. Both of these items have largely increased since that time. Average value of farms, $3,250. Valuation of live stock in our State was over $73,000,000. In 1850 over 13,000,000 bushels of wheat were raised; over 4,000,000 bushels of rye; over 26,000,000 bushels of oats; over 17,000,000 bushels of Indian corn; over 15,000,000 bushels of potatoes; over 3,000,000 bushels of barley; over 10,000,000 pounds of wool; and but one other state exceeds us in the production of the last article, and that is Ohio, which exceeds but by a fraction.

New-York is not behind some of her neighbors in manufacturing, mining, and mechanical arts. Her productions in 1850

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were $237,597,249, which is greater than the production of any other State in the Union, by over $80,000,000.

Our State, although not considered a large manufacturer of wool, is only behind one state in the manufacturing of woolen fabrics. Her productions in 1850 were over $7,000,000, which have been largely increased since that time. She also produces and manufactures more castings from iron than any other State; and her production of salt is the greatest in the Union.

I have thus, gentlemen, hastily glanced at some of the leading productions of the Empire State, more with a view to show how large a proportion of our wealth is intimately and immediately connected with agriculture; and at the same time allow me to ask in all sincerity, if you as farmers and producers of the great State of New-York, do not think you have some claims, with regard to this your Society, which ought to be more directly recognised by our Legislature.

In taking my leave of the Society, and retiring from the highly honorable and responsible position in which, by your favor, I was placed one year since, allow me to express my thanks most fully to the officers and members of this Society for their ready and efficient cooperation, in all the duties devolving upon us—and the readiness with which I have uniformly been sustained by their counsel and efforts, will long be a source of grateful remembrance to me. With confidence that the same kindness will be extended to my successor, I now, gentlemen, take pleasure in introducing to you our President elect, the Hon. Alonzo S. Upham, of the county of Genesee.

Hon. A. S. Upham, the President elect, was then introduced, and spoke as follows:

GENTLEMEN *of the State Agricultural Society:*

To have been selected by your choice to preside over the Representatives of the Farmers of the State, is an honor; my gratitude for which I can best show by careful and untiring attention to the welfare of the Society.

This Society is one of those dignified and important agents that is rendering labor honorable, and scattering blessings broadcast over the land—able and distinguished men have, while in this office, guided this Society with wisdom and vigor, and it is not without misgivings that I undertake to follow their example. Neverthe-

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less, gentlemen, I can safely promise you that the duties of this position can make no demands upon me that I will not cheerfully meet—and I enter upon the discharge of those duties cheered by the assurance that your valuable aid will be promptly tendered when necessary, and that the old and tried friends of the Society will continue to rally around the cause they have so long cherished.

Heretofore the duties of this office have been discharged by men who, although farmers, have also been connected with the learned profession or mercantile pursuits. This, I believe, is the first time that one, although a farmer, is chiefly engaged in mechanical pursuits, has been selected. Your Society has been an earnest patron of the mechanical arts, and the mechanics in return have contributed essentially to your prosperity as a Society.

With an ardent desire for your success, I assure you, gentlemen, that as a farmer or mechanic, I will do all in my power to secure, what we all so earnestly desire, the success of the Society.

The thanks of the Society were then, on motion of L. F. Allen, Esq., voted to the retiring President, and the gentlemen who had addressed the meetings; and their addresses were ordered printed in the Transactions of the Society.

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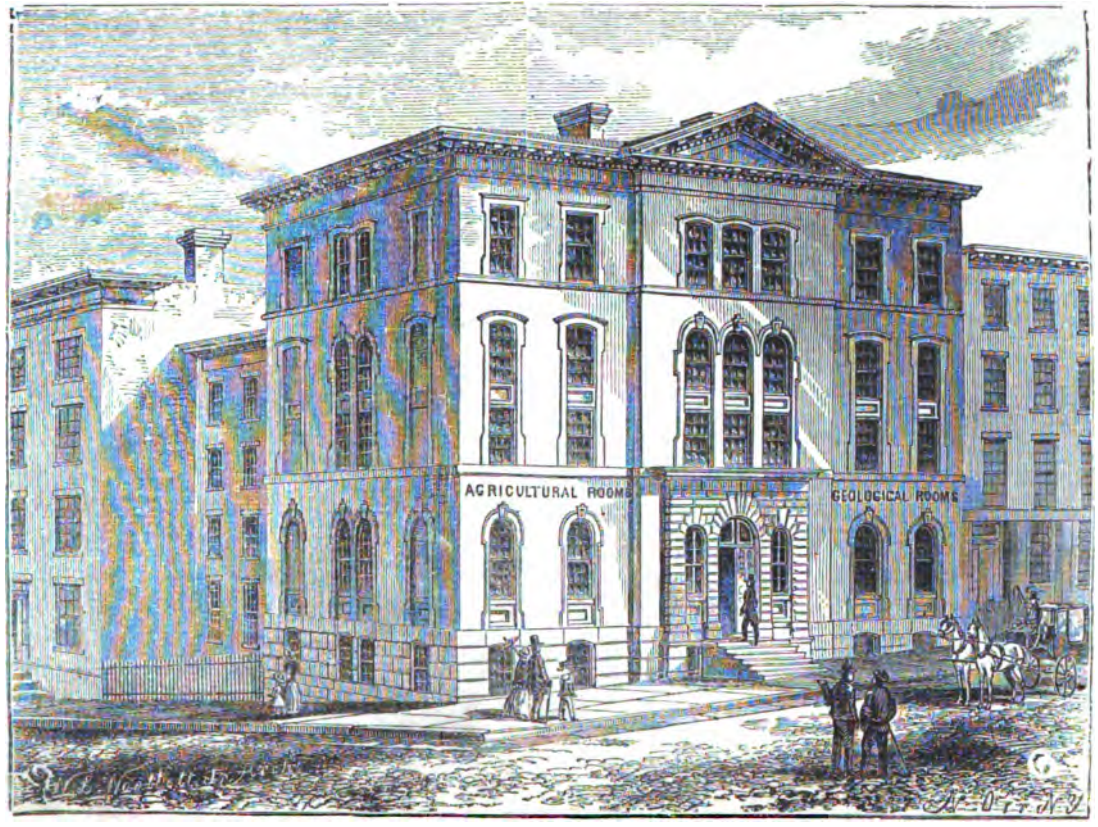

State Geological and Agricultural Hall, Albany.

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DEDICATION OF THE STATE AGRICULTURAL HALL.

It was a subject of much congratulation to the Ex. Com. that they were able to fix the period for the dedication of the rooms furnished for the use of the State Agricultural Society, during the winter meeting. Of the event, due notice had been given. There assembled in the spacious lecture room of the Society, (prior to a social reunion in the upper rooms, where, by the kindness and liberality of valued friends, a rich entertainment had been provided,) His Excellency the Governor, the Lieutenant Governor, the State Officers, the Senate and the House of Assembly, the former officers of the Society, the members of the Society and guests, filling the platform and spacious area of the Hall.

This was an era to which the farmers of New-York had but faintly hoped their cause would ever come. The State, this night was giving, by the presence of its authorities, its commendation of what had been done by the State Society to promote the wealth and happiness of the farmer, and its guarranty of equal and increasing support from the resources of the State in the future.

After the Rev. Dr. Rogers, of the Reformed Dutch Church, had commended the undertaking to the blessing of Heaven, the proceedings of the dedication were introduced by the Secretary of the Society.

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BRIEF HISTORY OF THE SOCIETY.

BY B. P. JOHNSON.

GENTLEMEN *of the New-York State Agricultural Society:*

We are assembled this evening on an occasion of no ordinary interest to the farmers of our State—the dedication of commodious rooms, prepared for the Society for the purposes of agriculture for all time to come. A brief history of the Society, from its organization to the present time, will furnish to the members the information as to the various proceedings which have been had in relation to securing a place where the farmers can be recognized, as the importance of their profession demands.

The State Agricultural Society was organized in 1832, by a few spirited individuals, assembled in this city from different parts of the State. Most of the gentlemen who were present at the organization of the Society are deceased; but those who are still living have continued firm friends of the Society, up to the present time.*

A constitution was adopted and the following officers elected, all of whom are deceased: Le Ray De Chaumont, Jefferson Co., President; Hon. Ambrose Spencer, Albany, Jacob Morris, Otsego, Hon. Edward P. Livingston, Columbia, Robert R. Rose, Seneca, Vice Presidents; Philip S. Van Rensselaer, Albany, Recording Secretary; Jesse Buel, Albany, Corresponding Secretary; Charles Webster, Albany, Treasurer; Henry W. Delavan, Saratoga, Horatio Hickcox, Rensselaer, John Townsend, Albany, Executive Committee.

The Society held a cattle show and fair in 1833, and had a very creditable exhibition; but the want of funds prevented a continuance of the fairs.

* There were present at the dedication the following gentlemen, who were delegates in 1832; Governor John A. King, Hon. Amos Briggs, of the Senate. Edward C. Delavan, Hon. Samuel Cheever, Hon. Joel Turrell, Hon. A. B. Dickinson.

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In 1834, *The Cultivator* was started by the Society, with Jesse Buel as its conductor. Its success was such as to induce Judge Buel to take charge of the paper, subsequently, on his own account, and the paper has been continued to the present time with great success.

In 1836, a convention was held at Albany, and a very large attendance of delegates from all parts of the State assembled, and very interesting discussions were had. Similar meetings were held for a few years, aiding and directing public attention to the subject of agriculture.

In 1838, a law was introduced into the Legislature, by Hon. Lewis F. Allen, then a member of the Assembly from the county of Erie, "for the encouragement of Agriculture;" but for want of time it failed to become a law.

In 1841, the act for the encouragement of Agriculture was passed, appropriating $8,000 for five years, to be divided among the Agricultural Societies, which has been continued to the present time. The State Agricultural Society was reorganized the same year, and a Cattle Show and Fair held at Syracuse, which was a most creditable one, exceeding the expectations even of the most ardent friends of the cause. These Fairs have been continued to the present time, increasing in interest, utility and importance every year. From 1841 to 1844 the Society had no rooms, and was indebted to the kindness of Luther Tucker, Esq., then Secretary of the Society, for a room in which the Executive Committee held their meetings for business. In 1843, a resolution passed the Legislature, directing the Commissioners of the Land Office to appropriate to the use of the Agricultural Society suitable rooms on the first floor of the old State Hall. In 1844, the Commissioners of the Land Office designated, for the future use of the Society, the rooms formerly occupied by the Comptroller. Mr. Henry O'Reilly, then the Secretary of the Society, occupied the rooms until December, 1844, when the Commissioners of the Land Office passed a resolution, assigning the Treasurer's room for the Society, in the rear of the wing of the main building on Lodge street, and directing the sign of the Society, which had been on the front of the building, to be placed on Lodge street. (The Secretary is not advised as to what influence caused this singular proceeding on the part of the Commissioners.) In

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1845, the Legislature passed an act giving to the Executive Committee of the Society free use of the Cabinet of Natural History, and the specimens there deposited. The Society was confined to this small room until 1848, when an application was made to the Commissioners of the Land Office for the use of the rooms originally assigned them by order of the Legislature; and the Commissioners (although the application was opposed,) restored to the Society the rooms originally assigned to them, and the liberty to place and maintain a suitable sign in front of the rooms on State street. Until this time the Executive Committee had no place to exhibit implements, of which they had a small assortment presented to them; but as soon as these rooms were opened, the collection rapidly increased, and the rooms were soon filled.

The Library of the Society, which had been commenced by Judge Buel, was increasing by exchanges and donations, and numbered in 1850, 600 volumes, and which has since been increased to 2,017 volumes, and 900 pamphlets, 19 maps, 67 paintings, 10 engravings, and 12 medals. Agricultural implements and articles for farm use in Museum 167, 20 cases of seeds and grains, five cases of insects, and three cases filled with miscellaneous articles. Publications received: 12 foreign, 56 from this country, in exchange mostly for the Transactions and Journal of the Society.

The rooms being entirely too limited for the objects of the Society, in 1852 a resolution was adopted at the annual meeting, that a memorial be presented to the Legislature, asking for an appropriation to enlarge the building, so as to accommodate the Society and the collection of Natural History.

In 1853, the Hon. T. C. Peters of Genesee, a warm and fast friend of the agricultural interest, introduced a bill in the Assembly for the improving the old State Hall; but owing to the state of the finances the bill was not passed. In 1854, the same gentleman introduced a like bill, appropriating twenty-five thousand dollars for raising and repairing the old State Hall, and building an addition thereto; and to the Hon. Robert H. Pruyn, then Speaker of the Assembly, and the Hon. Mathias Hutchinson, of Cayuga, Chairman of the Committee on Agriculture, in common with Mr. Peters, the Society is greatly indebted for the

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passage of this bill, and for its being carried into effect. In the spring of 1854, contracts were made and the work commenced; but the old building proving defective, the work was suspended until the meeting of the Legislature in 1855, when the sum of $15,000 was appropriated, to be used by the Commissioners of the Land Office, should they be satisfied that it would be unsafe to complete the improvements of the Hall, according to the contracts made under the law of 1854. The Commissioners met after the adjournment of the Legislature, and decided that the old building would not answer; and contracts were entered into for the erection of the building as now completed. Previous to commencing the work, the State Agricultural Society was assigned the two east rooms on the first floor of the main building and the entire wing of four floors in the rear, and the same were erected and arranged under the directions of the Executive Committee of the Society—comprising an office and library in the main building; a basement designed for a laboratory and store rooms; a lecture room, and an exhibition room of three stories—all of which are now completed.

The building committee, on the part of the Commissioners of the Land Office, were:

Hon. E. W. Leavenworth, Secretary of State.

Hon. James M. Cook, Comptroller.

Hon. John T. Clark, State Engineer.

W. S. Woolett, Jr., Architect.

Contractors—John Bridgford, John N. Parker and Joseph Davis.

The building was commenced in April, 1855, and completed in December of the same year—and *within the amount appropriated by the Legislature;* most creditable to the gentlemen above named, who had charge of the building, and an example, it is hoped, that will be followed hereafter by those superintending public edifices in our State and country. The last Legislature adjourned without passing the bill which contained appropriations for completing the building. The work upon the agricultural department had been commenced, and the Commissioners of the Land Office, after the Legislature adjourned, informed the Executive Committee that if they would provide the necessary means to complete their portion of the building, the workmen could con-

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tinue and complete it. The Executive Committee deemed it a matter of great importance that the rooms should be completed and arranged as speedily as practicable, as many of their implements and seeds were receiving damage in the places where stored; and they accordingly raised the necessary funds, amounting to $3,495.77, and the rooms which we are here assembled this evening to dedicate for all time to come to the use and benefit of the great agricultural interest of the State of New-York are presented complete.

In a report like this, designed merely to present before the Society the progress which has been made, and the manner in which we have moved forward, with many embarrassments in our way, it would scarcely be proper to enlarge. It may not be out of place, however, to state that in addition to the ordinary business of the Society, since 1847, it has been continually kept in view, as all important and desirable to be accomplished, that the farmers of the great State of New-York should be recognized at the capital of the State as they ought to be, and that for that purpose a suitable building for their use should be secured. This has been accomplished, and from the many testimonials we have had from our own citizens, as well as gentlemen who have traveled in all the countries of Europe, we are assured that no more commodious or well arranged rooms for the Agriculturists can be found; and we trust that now the rooms being prepared, we may soon, by the liberality of the farmers in furnishing us with the materials, have a Museum that will equal any to be found in any country.

Another object which has occupied the attention of the Executive Committee of the Society, has been a work on Insects, adapted to the necessities of the agriculturist. This has been begun under the directions of the able Entomologist of the Society, Dr. Asa Fitch, and the approbation which has been bestowed upon the work already performed, both in this country and in Europe, shows that a better selection for this purpose could not have been made. We have no fears that the Legislature will withhold any needed appropriation to complete the investigation. The collection now in the rooms indicate the manner in which the work is to be done, adapted to the wants of the practical farmer and the horticulturist.

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Another subject, an Agricultural School for the working classes of our State, we are happy to say, has been secured; and we trust that under the charge of the distinguished gentleman who has been called to preside over and direct it, and who is to address you this evening, it will eventually secure to our State all that science can do to aid the practical farmer in his work, and will give us educated farmers, who in the field, in the legislative hall, or in the councils of the nation, will be prepared to meet any other classes of our citizens, and act well their part for the honor and interest of their country.

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REMARKS OF

HON. SAMUEL CHEEVER, PRESIDENT N. Y. STATE AGRICULTURAL COLLEGE.

It is matter ef special gratification to the friends of agriculture in this State, that they have been able, through individual effort, as well as by united action through our State and County Societies, so far to win public confidence and public favor as to be able now to come together to dedicate, to our great agricultural interests, a hall erected for its use from the treasury of the State.

The people who settled this country came from the monarchies of Europe. In most of those countries the Feudal system prevailed, and still prevails to a greater or less extent. That system divided the rural population into two classes, that of landlord and tenant. The former class, although numerically much the smallest, through the machinery of government, possessed the wealth and power of the country. Such were the laws and such the social organization under them, that whatever might be the intellect or wealth of the farmer, he must till the soil of another. He must therefore belong to a subordinate class. Their people, from most classes came here and settled the country. It was the prevailing opinion at home that these people could not take care of or govern themselves; and in their kindness some of the needy members of the nobility came over to take care of them, and govern them as loyal subjects should be governed; asking nothing for such service, except a support in such manner as they themselves should prescribe, and such salary as the government at home should fix for the colonists to pay. These classes brought with them their laws and their religion, and they brought also their social caste and their social prejudices. The farmer who had been a tenant at home, and therefore of a subordinate class, although he here tilled his own fields, was ranged in the same class.

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Not only the official from the nobility, but the professional men, the lawyer, the clergy, the physicians and the commercial men, regarded the farmer as not of their set. True, the yeomanry came forward with great alacrity to shed their blood and to provision the soldiery from their storehouses, to carry the country through the struggles of the Revolution; yet as soon as independence was achieved and a nationality established, the farmer, by common consent, was permitted again to fall back into his former position. He there continued for more than half a century, cultivating his virgin fields in a downward way, knowing little of science in any of its relations, and nothing of it in its connection with the cultivation and treatment of the soil. The result was that a state of entire exhaustion followed in many instances, and great depreciation everywhere.

Luther Tucker, in 1831, established the *Genesee Farmer*, at Rochester, which, from the labors of his own pen, and those of many valuable correspondents, furnished a fund of valuable agricultural instruction, and at the same time urged upon the farmers the importance, indeed, the absolute necessity of an improved state of husbandry to save their farms from entire waste. The *Ploughboy* had, before that, been published at Albany, by Solomon Southwick—a paper marked with the characteristic genius and power of its editor. Judge Jesse Buel, of Albany, in 1834, commenced the publication of *The Cultivator*, which, in his hands, as well as in the hands of his successors down to this time, has shed so much light upon the Agriculture of this State and of all the States in the Union.

That he might teach by practice as well as by precept, Judge Buel purchased a small tract of land for a farm on the confines of what were then called the "Sand Barrens," west of Albany, and there very successfully showed by experiment, that by improved modes of cultivation, lands which had been thought almost valueless, could be made highly productive, and the cultivation at the same time be made remunerative. He gave the public the benefit of his experiments through the columns of his paper.

The Legislature, in 1832, incorporated "The New-York State Agricultural Society," to continue for the term of twenty years, with power to take and hold real and personal property; but lest

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the farmers should combine and turn speculators, they, with commendable caution, provided that their real estate should not exceed twenty-five thousand dollars. This charter was renewed in 1852, restricting their personal property to ten thousand dollars.

Notwithstanding the spirited exertions of many gentlemen in different parts of the State, not much was effected by the Society for the first eight or nine years after its first incorporation. But after the importation of our bread, to the amount of several millions of dollars, in 1837-8, made necessary, to a considerable extent from a neglected cultivation, and after many other evidences of a decaying agriculture, an energetic effort was made by many of the most active men of the State, as well agriculturists as others, to reanimate the Society, and through its agency, if possible, to awaken a spirit of improvement with our farming classes.

The Fair and Cattle Show were established and vigorously maintained, where the farmer could examine the improved farm implements in all their details. Specimens of farm produce were exhibited, giving evidence of the success of an improved culture; imported cattle, sheep and swine of various breeds were brought to his view, as well as home bred animals of the same stock, all contrasting strongly with his own at home. A spirit of emulation was excited at seeing the successful competitor drive off his prize animal or carry off his prize crop, bearing with it the Society's premium in testimony of its commendation. Those prizes were reported, and the course of breeding the animals and the culture of the crops by which they were won were also reported. This added greatly to the desire to read the agricultural journals; men wished to read of the success of their neighbors, and especially of the means by which that success had been obtained. The successful competitor needed no promptings to read of his own success, and lay by the report as a family record. Amongst the most valuable achievements of the Society, has been to set the farmer to reading and thinking. Twenty years ago an agricultural journal could rarely be found in our farmers' houses; now the house of a farmer, who is a farmer, can hardly be found without one. The Press has been a most powerful and valuable auxiliary to the Society; hundreds honestly admit that in the

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early efforts of the Society, their prejudices were strongly against it. They held "*book farming*" as a laughing stock; but the more they saw at our exhibition, and "the more they read, the less they found they knew." Their implements, their fields, their fences, their cattle, their sheep and swine, all show that they have read, and that "they have been to the fair." It is not to the improved cultivation of the soil alone, that we are to look for gratifying results from this reading habit with the agricultural classes; a moral and intellectual culture is showing itself most obviously. The agriculturist is raising his social standard; he is showing that labor need not degrade intellect, but that intellect may dignify labor. This Society has had constantly in view, not only by an improved system of husbandry to enrich the individual farmer and thereby enrich the State, but to raise him in his social and intellectual relations to a level to which his wealth and his intelligence so justly entitle him.

The Society, seeking beneficially to represent the great agricultural class of the State, has enjoyed the confidence and had the cheerful aid of many of the prominent men and some of the best minds in the State. They have had the countenance of all, and the aid of many of the Executives of the State, from Mr. Clinton down to the present incumbent, who has so usefully identified himself with its interests and so freely shared in its labors. But the Society has not been so successful in winning the confidence or securing the favor of all the officials in some other departments of our government. Up to 1843 the Society had not a place assigned them, by the State, even for an office. At that time the State offices and Supreme Court Clerk's office had been removed to their present quarters, which left the old State Hall vacant, and the Executive Committee of the Society applied for permission to occupy the first floor at the east end of the old building for their office and library, which was assigned them; but after a short time they were restricted to one back room, with the further restriction that they should put up their sign on a cross street and enter there, without permission to have a sign *at the front door*. Whether some of the old feudal sentiment still remained, or from what cause this restriction was imposed, was not disclosed; but for the privilege of having an office at all, even upon a cross street, the Society was suitably thankful.

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It may not be amiss to state that the Society at that time represented the great agricultural class of our population; a class, numerically, more than half the State; and a class, too, which that very year was paying into the treasury, by direct taxation, more than half of a mill tax, amounting to near three quarters of a million of dollars, levied the year before, at the instance of the same officials, under an "act to pay the debt and preserve the credit of the State." The Society continued to enjoy the privilege of occupying this rear room until 1848, when their library and museum had so increased that they were in want of more room, and they applied again to the Commissioners of the Land Office, then composed of different individuals, for permission to occupy the front room at the east end, which had been first assigned them. The privilege was granted by the vote of all the members of the board, except the then Comptroller dissenting, and with further privilege to the Society, in behalf of the great agricultural population of the State, *to enter at the front door*. From that time to this the currents have run more smoothly with them.

You will therefore readily comprehend the gratification I expressed in behalf of the Society, at being able now to meet to dedicate to their own use, although not a whole building, yet apartments commodiously arranged and ample in extent to meet at least their present wants. And it is not the less gratifying to know that, in testimony of the high estimation in which the usefulness of this Society is held by the people of the State and their representatives, these apartments have been provided from the State Treasury.

It is also matter of great gratification that at the same time the State has made such acceptable provisions for this Society, it has also, in the same edifice, provided accommodations for the State's Natural History—a department of science which has long and deservedly attracted the attention of the people of the State, and bountifully shared their munificence. There is great fitness in this arrangement; there is great intimacy between the Geology, Mineralogy, Botany, Zoology and Entomology of the State, and its agriculture. Geology teaches us the order, arrangement and position of the rocks; Mineralogy teaches us where the elements are found which, when the rock is crumbled down, give fertility to the soil which it forms. We wanted a science to teach us the

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constituent parts of the agricultural plant, that we might know its wants, and what elements to select from the great mineral storehouse, to supply those wants and give it growth. This instruction the agricultural chemist and analyst have given us. Zoology gives us the form, classification, history and habits of our animals. Here the chemical analyst comes again to our aid and shows us the component parts of the animal, and points to the vegetables to supply them. Chemistry is here the connecting link between these sciences and that humble yet gigantic agriculture, which shares so largely in the public burthens, and at the same time gives sustenance to the whole family of man, including the men of all the sciences. Botany, too, teaches us the history of our plants, from the forest tree to the blade of wheat—their classes and orders, their habits and their wants, as well as their adaptation to soil, climate, temperature and moisture.

The foregoing sciences make the farmer acquainted with his friends. Entomology introduces to him the insect tribe, and makes him acquainted with his enemies: it teaches him their history, their habits, the time and manner of their annoyance, and, as far as known, the best means of defence against their ravages, and the means for their destruction.

Valuable, indeed, to science and to the world, are the labors of the Geologist, the Mineralogist, the Botanist, the Zoologist and Entomologist; but not less valuable are the labors of the Chemist, the Analyst and intelligent Agriculturist, who take their work where they leave it, and elaborate and appropriate it to the wants and practical purposes of life. It is humbly but confidently claimed that the intelligent Agriculturist, who successfully applies the principles of these sciences, to enlarge and to improve the means of human life, is entitled to a share in the general commendation as a benefactor of his race.

Franklin, through his genius and acute investigating powers, succeeded in leading the electric fluid from the cloud to the earth at will, using a wire for his highway, and a large kite to give it elevation and direction. The monster power of this invisible agent had long been testified to by the shattered edifice and riven oak; we had also long known that the electric spark, in passing from a positive to a negative medium, would perforate a paper card. Still this giant force has been permitted to slumber

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about us for more than half a century after all this was known of it, until the practical genius of Morse led him to the effort to appropriate it to utilitarian purposes. He doubtless reasoned, that if the positive medium would exercise a force to perforate a card, by means of a properly contrived machine, it could be made to throw out a metalic point, and that point would make a dot; and if thrown upon a moving surface, and held there, the dot would become a dash, and with the dot and the dash, longer or shorter, an alphabet could be formed. That machine and that alphabet he contrived, and the telegraph was completed. Franklin took the step in the great work: he showed the world that this monster power could be controlled—*could be led at will.* The world admired his genius, but profited little by it, except that he taught to lead the lightning from the cloud to the earth on the outside of the edifice instead of the inside. But when the practical genius of Morse put a pen upon the end of Franklin's wire, and made it the instantaneous messenger of thought, irrespective of distance, he brought all Christendom upon its feet, and a new era in the world's history was commenced.

Franklin gained immortality by taking the first step; Morse gained a better immortality when he took the work where Franklin left it, and applied it to the benefit of his race.

Watt placed his name upon record as a public benefactor when he improved the steam engine and made it an effective power; but Fulton made himself immortal, and gave also celebrity to Watt, when he applied the steam engine to purposes of navigation and produced a revolution in the carrying trade and travel of the civilized world.

The geologist who traces a new development in a protozoic layer, makes a contribution to science; but the chemist and agriculturist who follow him and discover a fertilizing element in the crumbling fossil of the trilobite found in the rock, and apply that fertility to the growth of the cereal plant, make a contribution to the means of human life.

When, from the fossil of the saurian, the geologist defined the age of the rock where dry land first appeared, he made a valuable achievment for science; and the chemist also made an achievment when he traced the fertilizing carbonate in that fossil; but the agriculturist made the final and not the least achievment for

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human benefit, when, from the application of that fertility, he rept his wheat and fed his herds where the saurian first grazed the lichen and the fern.

Science alone will not teach the agriculturist all he is to know to attain a high and a successful cultivation. Practical experiments intelligently conceived and carefully executed, are first to elicit facts—to shew results, before reliable systems can be established. To procure such experiments and bring out results, has formed an important part of the labor of this Society. To accomplish it, their premiums have been liberally offered and paid. The results have been highly satisfactory. Amongst these results are better plowing, better breaking down and pulverizing of stubborn soils, better attention to time and manner of seeding, better manuring, better rotations of crops, better cultivating and securing of crops, and withal, by a proper rotation and a proper manuring, a *compensating system* has been taught by which, whenever a crop is taken off, its equivalent in fertility is returned to the soil. For draining too, the Society has been liberal in its premiums; the result is that thousands of acres of our lands, and some too which were thought not to need it, have been greatly improved, and some brought from a worthless state to that of the first class in their neighborhood. From reported results, immense numbers of farms have been improved, as well by draining as by those other means, to an increase in their yield from twenty-five to more than one hundred per cent., and have been increased in their marketable value in an equal ratio.

The improvement in our farm stock has been as successful as that in our agriculture proper. There is hardly a distinguished herd of Shorthorns, Devons, Herefords or Alderneys in England, or Ayrshires in Scotland, that has not its representative here. So too of the Leicester, Cotswold and Southdown flocks of England, and also of her hog pens. The best fine wool flocks of Spain, of France, of Saxony and Silesia, have been largely drawn upon to fill our sheep walks and improve our staple. This improvement, it is to be borne in mind, "is greatly due to the munificence and public spirit of many gentlemen not engaged in agriculture as a pursuit." But to all who have taken part in it, the Society has cheerfully offered its premiums, and what has been to them much more acceptable its mark of approbation.

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Thus, to teach the agriculturist the connection which the foregoing and other sciences have with practical agriculture, and their importance to an improved state of husbandry, the Society, by means of premiums offered and otherwise, have been able to place in the volumes of their Transactions a fund of scientific and practical instruction of great value; prominent amongst which are the Lectures, Addresses and Essays of Prof. Johnston of England, and Prof. Norton of this State—the death of both of whom, in the full tide of their usefulness, the Society as well as the cause of agriculture, both in England and America, have great cause to lament. The agricultural surveys of the counties of Washington by Fitch, of Seneca by Delafield, of Essex by Watson, and Madison by Evans, are papers of great value, not only to the agriculturists for their instruction, but to the general reader for their historic reminiscences and romantic details. The Entomology of the State by Fitch, so far as completed, and his Lectures upon the same subject; the Analysis of our cereals and plants by Emmons and Salisbury; the Meteorological Papers by Hough and others, and a Complete System of Farming by Watson, give to the farmer and general reader instruction of great interest. Added to these are essays and papers upon almost every subject connected with agriculture or horticulture, together with addresses from many of the distinguished men of the country, fraught with instruction, and in many instances with glowing eloquence. For the selection of the material for these volumes, and their compilation, are we largely indebted to our Secretary, Mr. Johnson and his predecessor. These volumes form a library of themselves upon these subjects, and it is gratifying to the members of the Society to know that the public, both in this State and beyond it, have given evidence of their high appreciation of their value.

Our Annual Fair has come to be one of the institutions of the State, and the scores of thousands who annually flock to its grounds from all classes and all ranks of society, give very gratifying testimony of the high estimation in which it is held. With these evidences of public approbation before them, the members of the Society have the satisfaction to believe that the Legislature, in making appropriation for these accommodations for the Society, have not been in advance of an intelligent public sentiment. It

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is hoped and confidently believed that from the public spirit and well directed efforts of its present and its succeeding members, the future of the Society will fully sustain its past, and that public expectation, high as it may be entertained, will be fully met.

To do what has been done, and to accomplish what has been accomplished, has not satisfied all the wishes of the members of the Society and its friends. They were early impressed with the conviction that to cultivate the soil as it should be cultivated, to improve the soil and to improve the farm stock as they should be improved, and to raise the farmer in his social relations and in his intellectual capacity to a standard to which he is entitled, and to that public position where the best interests of the State would place him, he should be better taught, and better means of giving him instruction should be provided than are now within his reach.

As some successful steps have been taken towards the accomplishment of so desirable an object, I will take the liberty, at the risk of being thought a little tedious in detail, to state what has been done, and some of the difficulties that have been encountered by those attempting it. It may not be amiss to state that whatever has been done, and by whomsoever done, has been a gratuity. Judge Buel, in his lifetime, in the columns of *The Cultivator*, repeatedly urged the necessity for providing a school connected with an experimental farm for the education of our farmers' sons. The former Surveyor General, Simeon De Witt, wrote a very able paper upon the subject, which was published in pamphlet form in 1819, in which he presented the advantages to be derived from such an institution, with great force.

This Society, for several years in succession, passed resolutions recommending, in general terms, to the Legislature to provide for such a school. In 1849, the present Executive of the State, then President of the Society, in obedience to a resolution passed by it, appointed a committee to present a memorial to the Legislature, asking an act to establish an Agricultural School, and for an appropriation for the purpose. The committee presented the memorial, setting forth its necessity, and the advantages to be expected from it; and they also gave the outlines of a plan and a course of studies to be pursued. The Legislature printed the

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memorial (Assembly document No. 65, of that year); it went to the Committee on Agriculture, who reported favorably upon it and reported a bill, but it did not pass; but a joint resolution was passed, directing the Governor to appoint a commission of eight, one from each judicial district, to prepare and report a plan for an Agricultural College and Experimental Farm. The commissioners were appointed, and prepared and reported a plan to the next Legislature (Assembly Doc. No. 30, 1850). That report went to the Committee on Agriculture, who reported favorably upon it with a bill, but the bill shared the fate of its predecessor.

The friends of the project, who had spent so much time and labor and thought upon a matter in which they had no individual interest, seeing little prospect of success at present, concluded to suspend their efforts, "and wait what change the wheel of time might bring."

The next movement, as you learn from the present executive of the State, was by the lamented John Delafield, of Seneca county, who, in 1853, came to the Legislature, and with great exertions, aided by many personal friends and friends of agriculture, procured the passage of "an act to incorporate the New-York State Agricultural College," naming a board of ten trustees in the act. No pecuniary aid from the State was provided in the bill, and Mr. Delafield and the trustees were left to begin the work from private contribution.

The trustees designated the farm of Mr. Delafield, about two or three miles east of Geneva, for the college, when means should be procured to purchase it and go forward with the work. Considerable progress had been made in obtaining subscriptions to the fund, when Mr. Delafield suddenly died.

In the year 1855, the people of Ovid, in the county of Seneca, and its vicinity, with a most commendable public spirit, made an active effort to revive the project. A subscription was got up and a large sum of money subcribed for the college. The Rev. Mr. Brown of that place, who had been very active in procuring the subscription, was commissioned to come to the Legislature and, if possible, procure pecuniary aid from the State to prosecute the work. His efforts were promptly seconded by the friends of the project from different parts of the State, and the last Le-

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gislature, after repeated denials from their predecessors, passed the first act making pecuniary appropriation for the establishment of an Agricultural College—a legislative act which, I have the fullest confidence, each individual member will hereafter look back upon with as much satisfaction as upon any public act of his life.

The act provides for loaning, from the surplus of the United States Deposit Fund, forty thousand dollars for twenty-one years, without interest, to be expended in the purchase of a farm in Seneca county of not less than 300 acres, and for the erection of college buildings thereon, provided the like sum of forty thousand dollars should be obtained by private subscription for the same purpose, and its payment secured to the satisfaction of the Comptroller, and the land so purchased to be mortgaged to the State, to secure the payment of the forty thousand dollars loaned. This appropriation is much less than it should have been, but it enables the trustees to make a beginning.

The trustees met at Ovid in June last, and filled some vacancies in their Board, and made some examinations with a view to the selection of a farm, and adjourned to the first week in September. They met in September in full board: three groups of farms were offered for their use, one at the east end of the town of Ovid, on Cayuga Lake, and two adjoining the village of Ovid. After a careful examination of them, and after hearing the suggestions of the advocates for each, they selected one embracing about 680 acres of land (to be purchased when their means will permit,) bounded at its east end by the village of Ovid, west by Seneca Lake, and north by the road leading from the village to the lake—from which road the whole farm can be seen. It is about half a mile wide upon the lake, and over two miles in length between the lake and village. The land is of good quality, well adapted to the growth of wheat or any other crops grown in the State, as well as to fruit. It is well watered; several hundred acres of it may be conveniently irrigated if desired, and the college supplied with water from an elevated fountain. There is a very suitable spot for college buildings about one mile from the lake, on a crown of land draining outward in every direction, and commanding a view of Seneca Lake for more than twenty miles, and large portions of the eastern slopes of the counties of

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Yates and Ontario. The Ovid Landing is at the west end of the farm, on the lake, about midway between Geneva and the Central railroad at the north, and Jefferson on the Elmira and Canandaigua railroad at the south end, from each of which points a steamboat reaches the farm in two hours and a half, in connection with the runs upon the roads. There are more than one hundred acres of heavily timbered wood upon the farm. The private subscriptions which are to be received in payment, it is expected will cover the purchase within about five thousand dollars. Possession is to be taken of the farm on the first of April next, plans and specifications are in preparation for college buildings, and arrangements making to procure materials for their construction.

The means as yet within the reach of the trustees will not be sufficient to meet the purchase of the land, the erection of proper college edifices, farm buildings and fences, the purchase of farm stock, teams and farm implements, college furniture, including kitchen and laundry, philosophical apparatus, laboratory equipments, &c. But they intend to proceed as far as in their power, using the means in their hands with the strictest economy and to the best possible advantage, trusting that the same individual liberality which has so conspicuously shown itself at Ovid will at least to some extent, be found elsewhere, and that our Legislature, bearing in mind that they are annually taking, by direct taxation from the agricultural class alone, more than three-quarters of a million of dollars to sustain the finances of the State, that they may carry forward our public works to completion as well as to uphold our public charities and higher institutions of learning, will feel the justice of letting in the farmer-class to a small participation in that fund to which it has so long and so liberally contributed.

Our legislators cannot but be aware that when, by direct taxation, they take the money from the farmers of their own State to improve our canals, a large portion is taken to cheapen the transportation of the produce of the Western States in this direction, and of course to increase the quantity brought upon our markets. It is a law of trade, that an over supply depresses the market. This increased supply enriches the forwarder, the warehouse man, the commission merchant, the buyer and seller, and the shipper, and all connected with them, whilst with the farmer the direct

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taxation increases his burthens, and a depressed market diminishes his means to meet them. His only means of defence against this is an improved husbandry: for that improved husbandry he wants better instruction than is now within his reach. The intelligent agriculturists of the State are, with great unanimity and with great confidence, looking to this institution for the means of that instruction, an instruction by which the fertility of mind is to be set against the fertility of the prairie. The legislator should not withhold the aid of the government from an institution so to educate the farmer of his own State, unless he is prepared to treat them as the brickmaking Israelites upon the Nile were treated, when the taskmasters increased their tale of bricks, and at the same time took away their straw with which they were to make them.

It is contemplated to commence instruction in this institution under a course of three years' study; the year to be divided into two terms, the summer and winter terms; the summer term to commence about the first of April, and ending in October or first of November; the winter term to commence in December and extend to March. It is expected to bring the expense of the course down to about $150 per year, including board, washing and instruction.

It is contemplated to teach some literature, such as Belle Lettres, History, French, German, Latin and Greek languages, some or all of them, if desired; Natural Philosophy, Mathematics, so far as to embrace amongst others Land Surveying and something of Civil Engineering and Mechanics; Geology, Mineralogy, Inorganic Chemistry, Organic Chemistry, particularly in its connection with vegetation and agricultural fertilizers; Botany, in its connection with agricultural plants; Zoology, in its connection with domestic animals and their physiology; Entomolgy, in its connection with such insects as are injurious to agriculture or horticulture; Meteorology, in its relation to oceanic and atmospheric currents, and their effect upon temperature and moisture, and consequently upon vegetation; the Laws of Storms, so far as known, and the evidences of their approach.

Then it is proposed to teach Scientific and Practical Agriculture, showing where fertilizing elements are found in inorganic bodies, and the best means of their procurement and application;

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so also of such elements in organic bodies, how they are to be created and how best applied; teaching also their agency as they pass from the soil to the plant, and from the decayed plant back to the earth, or when taken by the animal from the plant, then from the animal, either in his secretions or from his own decayed body, back to the earth again; and to teach also the best means of increasing and preserving these fertilizers as manures upon the farm. Then to teach the adaptation of different crops to different soils, the best mode of preparing the ground, seeding, cultivating, housing and preserving the crop: to teach also the simplest and most accurate mode of making experiments in the different modes of cultivating the same crop, such as different depths of plowing, different time of seeding, different preparation of the soil, application of different manures, and different manner of applying the same manure; the present and future advantages of putting the same quantity of manure on a greater or less quantity of land; the advantages of draining and irrigation, and the best mode of doing the work; the best mode of breeding, rearing and fattening domestic animals, testing the merits of different breeds, side by side, under the same treatment, where the animal shall be statedly weighed and the food he consumes also weighed, and a record kept of the results; so of the cow and her milk, and its products in the dairy; the diseases of animals and their treatment, and especially the diseases of the horse and the injuries to which he is subject; the preservation and growth of the forest; laying out of farm lots and fencing, road making, both upon the highway and upon the farm, such as overcoming elevations, passing ravines and bridges, with draining and facing; the grafting, budding, setting, cultivating and pruning of fruit trees; the construction of farm buildings and their adaptation to the purposes required; a simple and accurate mode of keeping farm accounts, with a general system of farm management, by which the most may be done in the best manner and at the least expense and at the same time the farm improved; to teach the use of all farm implements, as well those by hand as those by animal power, and also the use of mechanical tools so far as to repair, if not make, the common farm implements, and make the lesser repairs upon farm buildings.

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For the acquisition of this practical instruction, some labor from the student upon the farm will be required at stated times in the pleasant part of the year. It is believed that this instruction can be given and this labor performed in the field without prejudicial interference with the studies in the college. It will be, to some extent, a substitute for the gymnastic and other exercises found necessary in other institutions for the promotion of health and of a proper physical development.

It is believed, that to use the field as a laboratory to illustrate the principles of these sciences, in connection with their study in the college, will give them increased inferest and attraction, and will have a strong tendency to educate the farmer's son back to the farm instead of educating him away from it.

The estimation in which Agricultural Schools are held in Europe should be an instructive lesson to us. The rapid improvements now making there, in their agriculture, is attributable largely to the scientific and practical instruction obtained at their Agricultural Schools. The advantages arising from them have been so palpable, that they have been increased with most astonishing rapidity.

Mr. Coleman finished his report upon the State of Agriculture in Europe, in 1844, and he describes nine agricultural schools. But a few others existed on the continent, in countries which he did not visit. From a recent investigation, it is found there are now 352 there, most of which have been established since 1844 some by government patronage alone, some from individual enterprise, and some from the two united.

Their governments establish them to increase the productions from their lands, that a larger population can be sustained, and that population be in a better condition to sustain their public burthens. The landholders do it as the most effectual means of increasing their yield, that they may increase their rents. It is found, as a matter of finance, that no investment pays better. To them it is like the improved farm implement, the work is better done and at less expense. How much stronger the inducement to establish them here, where the people are the government, and where they own the soil. Where the individual is to be enriched, the State is to be enriched, and the citizen elevated in his moral, his social and intellectual standard.

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The trustees flatter themselves that this institution is not to be in competition with any other part of our educational system, but to meet the wants of a class not hitherto provided for. The common schools are not to be touched, either in their finances or their educational arrangements. The academies, as preparatory institutions, are to be benefited; as the field, for preparatory studies, is to be enlarged to meet the wants of this. Our colleges, so well suited for professional training, are secure from encroachment. This is to fill a space not occupied; like the Asteroids in the solar system, it is brought to fill the place of a missing planet.

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REMARKS OF W. H. BOGART, ESQ.

[The Hon. Joel T. Headley, Secretary of State, was expected to have addressed the Society. The following letter from Mr. Headley explains the reason of his absence:

ALBANY, *February* 12, 1857.

B. P. JOHNSON, ESQ., *Secretary State Ag'l Society:*

My Dear Sir—I am sorry I cannot be present to-night at the Agricultural rooms. I should have written you before, but I continued to hope, until a short time ago, that I might be present. My doctor, however, forbids me to go out, and my lungs are wholly *unusable.*

Yours sincerely,
J. T. HEADLEY.

W. H. Bogart, Esq., was requested to supply the vacancy, and the following remarks from him shows how well the duties were discharged.]

Mr. Bogart alluded to the old State Hall, on the site of which this new and beautiful building was erected. The young man who, in 1764, received the honors of King's College, (that eminent university which now, under the better name of Columbia, is winning to itself such renown,) passed through a long series of civic, judicial, diplomatic dignities. It was while he was Governor of this State, that the Legislature directed the construction of the building which occupied where this new hall now rises. In the record of the acts of 1797 is the simple announcement—An Act to provide for the erection of a public building in the city of Albany. The name of John Jay cannot be dissevered from the archives of this structure.

And well has the State done in thus giving to the farmers a Hall for the records and the affairs which belong to that occupation, by the side of which all others are the heart-wearing and the care-worn. The farmer begins where all other occupations and

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professions end—by raising his bread. This is the nobility of pursuit, kindred with the history of the earth.

It was of this that it was so admirably said:

> "From yon blue Heaven above us bent,
> The grand old gard'ner and his wife
> Smile at the claims of long descent."

Change and vicissitude come to all that man works out in his years of struggle with the world, but less to that man who devotes himself to the culture of the earth, than to others.

The day must come when remembering that they possess their share in the beautiful and pleasant, beyond other men, since all that nature can carve or paint is theirs, the farmer of New-York shall bring around him every thing that shall make his home the happiest of the earth.

Mr. B. continued in this comparison of the farmer's life, with that of those whose pursuits led them away from the country.

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REMARKS OF HON. T. C. PETERS.

Mr. President—As I can only occupy but a brief space in the time left for those gentlemen who are to follow me, I shall confine myself to a few remarks upon that system of agriculture, the most profitable to be adopted by the farmers, and encouraged by this Society.

Agricultural progress consists in the permanent improvement of the soil, whereby it is made to yield an increased product. This can only be done through the stock kept upon the farm, for it is only by means of his domestic animals that the farmer can procure the manure necessary to ameliorate his soil or maintain its fertility.

The State of New-York possesses as great capacity of production, and her facilities, as an agricultural State, are as numerous as those of any other State in the Union. It is our duty to see that they are properly understood and improved.

The real dairy region of the United States, as compared with its whole area, is very small—compared with the land now in use, it is about one-fourth, compared with its whole area it is less than one-tenth. The western and southern line of Pennsylvania is the extreme limit west and south of the true or primary dairy region. The basin of the lakes may be considered as within the dairy zone, but it is secondary to this.

Our own glorious State, from its conformation and situation, is the heart of this favored region, and is peculiarly fitted, both by soil and climate, for the fullest development of dairy products. It becomes important then to know whether it constitutes the most profitable branch of farming.

To obtain a satisfactory solution of this problem, permit me to submit a few statistics. The acres of land in use in

1821	5,717,494
1825	7,160,967

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1835	9,655,426
1845	11,757,276
1850	19,119,084
1855	26,758,182

The land in use includes all that belongs to the farm, whether in wood or under cultivation. If the figures of the last census be true, it would appear that there are less than three millions of acres of land in the State yet to be brought into use.

The land brought into use during the last thirty years has nearly quadrupled, yet it does not appear that any crop or kind of stock has increased in an equal ratio. Thus in 1821 we had 1,215,049 head of neat cattle, and in 1855 there were but 2,105,464. Of horses, in 1821 there were 262,623, and in 1855, 568, 700. A most remarkable change in our stock is in regard to sheep: in 1825 there were 3,496,539, and in 1855, 3,207,024 —nearly 300,000 less than thirty years ago. But in 1845 we had 6,443,855, there having been a steady gain from 1821 to that date. From that year they have steadily decreased, so that the loss in the last ten years has been 3,236,858, and the decrease in the quantity of wool produced is not far from five millions of pounds. As this great decrease has been in the fine wooled breeds, it is evident that wool growing in this State has ceased to be a profitable branch of general farming. This decrease in sheep is the more remarkable from the fact that the crop of wheat has also very largely decreased—so much so, that our State can no longer be classed among the wheat exporting States.

In 1840 we produced 12,286,418 bushels of wheat, and in 1845 the product was 13,391,770 bushels. From that year it declined till 1855; the product of spring and winter wheat was only 9,092,402 bushels, and the product of the past year probably did not exceed six millions of bushels. In our spring crops there has been no material change, except in corn. This crop, perhaps the most important growth upon the earth, has been rapidly increased during the past fifteen years. In 1840, there were 10,972,286 bushels, and in 1855 there were 19,290,691 bushels.

We find when we turn to the dairy statistics, that the tendency of our farming has been in the right direction. In 1845 we had

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999,490 cows, and in 1855, 1,058,427, though the number had decreased to 931,324, making the increase during the last five years equal to about 25,000 annually. In the products of the dairy some facts are disclosed worthy of notice. In 1845 we produced 79,510,733 pounds of butter and 36,744,976 pounds of cheese, making, an aggregate of 116,246,709 pounds. In 1850 the butter had increased only about 100,000 pounds, while the product of cheese had gone up to 49,741,413 pounds—nearly thirteen millions of pounds during the five years. But in 1855 we produced 90,293,073 pounds of butter and 38,944,249 pounds of cheese—the aggregate dairy product of that year being 129,237,322 pounds, against 129,507,000 in 1850. This large increase in butter and decrease in cheese would seem to indicate that butter making was more profitable than the manufacture of cheese. It is not improbable that the census of 1860 will show a still greater difference, for there can be little or no competition with our best butter in any market. Its continued advance in price, notwithstanding the large increase of land brought into use in the United States, is a sufficient guarantee to the farmers of this State, that in one branch of agriculture they have nothing to fear from the fertile lands of the West.

Herein then is our strength, and through this branch of agriculture we can distance all competition, and create upon our own farms a perpetual mine of increasing wealth, unlike all other mines, possessing within itself the power of perpetual replenishment. If we rightly direct our energies, our agricultural supremacy is as certain as our commercial.

Sir, I believe our future progress and prosperity depends upon the proper encouragement and increase of the dairy. We need some healthful employment for our sons and daughters at home, upon the farm—something that will teach them care, regularity, and the importance of systematic and useful labor. No branch of farming furnishes all these requisites so fully as does the dairy. Why, sir, it's our fault that our girls are decked out in the absurd costumes of a French milliner; we do not furnish them with employment, and we must not be surprised that their better natures thus run to waste. If we neglect to learn them how to hoop cheese, ought we to wonder that they turn to hooping themselves? Nor ought we to wonder that our sons are growing up the

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walking advertisement of some fashionable tailor—as empty and less useful than the decorated block that adorns his show window. If we would reform the vices of the country or the city, we must begin at our own firesides with that system of education which will send forth our children, men and women, with educated hearts and hands, as well as educated heads. And it is our duty to so educate our children that the milkmaid and her companion will be fitted to adorn the mansion of a Governor or the Presidential White House.

My own humble agency in regard to this Hall has been alluded to by my long time friend, the Secretary, (Mr. Johnson.) If there be any credit due to me, it is in a still higher degree due to those who assisted me so well in procuring the necessary appropriation. Twenty-five years ago, such a Hall as we are now dedicating was among my waking dreams; and I am most happy, Sir, in being able to stand up here to-night among the speakers whose voices are first heard within its walls. We shall pass away, and our places be filled with another, and other generations; but the active men of the present generation, who have been steadily engaged in helping forward the great cause of agriculture, will leave here a proud and enduring monument that shall witness to their memory for all coming time; and may our good Secretary live a thousand years to enjoy it, if he can be as useful as he has hitherto been.

Sir, the services of this night mark an era in the history of our Society, and we may well pause and look back upon what thus far has been the benefits of its existence. In our own State this spacious Hall and the beautiful rooms above, bear ample testimony that the farmers are no longer satisfied with the little tin sign on the back street, but have ordered it to the front. Aside from the benefits which have been poured out over the whole State, reaching into every dwelling, spread out on every farm, and blooming and ripening its fruits in every garden, the New-York State Agricultural Society has been the parent and pioneer of every State Society in the Union. By her example others have been stimulated, until each year there are at least fifteen millions of people set in motion to participate in the pleasures of the farmers' holidays. Nor is this all; our Society has done more to make our people and nation known and appreciated in Europe,

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than all the diplomacy of the general government since the Declaration of Independence. Through its exertions a new impulse has been given to education; and I was exceedingly rejoiced last winter when I saw that an appropriation had been obtained for the Agricultural College, and only regretted that it was not larger.

Perhaps it may not be improper for me here to allude to the location of a kindred institution in its neighborhood. I allude to the People's College, which has been recently located at Havana, because it was thought by some that there was to be a rivalry between them. Such is not the design; there is room enough for all, and the only rivalry, if any, will be which shall do the most good. It is true, the People's College has a farm, and will teach Agriculture and Horticulture; but it will also be prepared to give a practical education in the whole range of mechanics, compelling the education of the hands as well as the head and heart, and sending forth its students for usefulness in whatever walk of life their lot may fall. And we hope to place in the hands of the Society, during the present year, the results of experiments that will be worthy of consideration.

Mr. President, I have already exceeded my allotted time, and in closing, permit me to return you and the Executive Committee my most hearty thanks for the honor which they confer upon me in placing me in the position which I have occupied here this evening.

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REMARKS OF HON. WILLIAM KELLY.

MR. CHAIRMAN:—After the interesting and eloquent addresses to which we have listened this evening, I shall not venture to make any extended remarks, but briefly mingle my congratulations with those of every farmer present, on the event which we are here to celebrate. I regard the gift of this commodious and beautiful Hall to the State Agricultural Society, as one of the most cheering events in its history. This outspoken acknowledgment of the importance of agriculture to the prosperity of the State, and this manifest disposition to encourage all well directed efforts for its advancement, are calculated to cheer the farmer, and stimulate him to renewed and increased effort.

The most important pursuit in every civilized country is agriculture; it is the corner stone of prosperity to the body politic and to every branch of industry, whether of commerce, manufactures, or the arts. Where agriculture languishes, or fails to make a fair return, every other department of labor must suffer with it. Where, on the other hand, the cultivator of the soil prospers, all other pursuits and callings prosper likewise.

In this view of the subject how necessary it is that every encouragement should be given to those associations which seek to render agricultural labor more productive, by bringing to its aid the wonders of mechanism and the mysteries of science. How gratifying to know that the art is advancing year by year, that the relations of science to it are now the subject of study to many of the ablest minds, and that interesting and valuable truths are constantly developed; truths which at times astonish, and always interest the man who has at heart the welfare and prosperity of his country.

Such an act of encouragement was the liberal and graceful gift of this noble building, which we this night dedicate to agriculture. Here, at the seat of government, is a resting place—a

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home for the farmer. For long years, I trust for ages to come, as he crosses this threshold, he will take a prouder step, feeling that the true dignity of his calling has been recognized, and his heart will throb with still stronger love to the great State under whose benign protection it is his privilege to live.

Citizens of the State of New-York, God has given to you a proud and responsible position in this mighty nation, nay, in the world. Brightest of all the gems that deck our nation's banner, is the star which marks the Empire State. Foremost in commerce, with a navy of merchantmen that exceeds the commercial marine of nearly every other nation; equal to any, so far as regards enterprise and success, in all the industrial pursuits of life; second to none in her provision for the education of her people; a model for imitation in her successful efforts to advance the art of agriculture; the most prosperous community which the world presents.

Have I spoken too highly of her position as first among her sister states in agriculture? I think not. Those fertile States of the West, which seem blest beyond all other lands in the richness of their soil, are, I well know, making rapid strides; but we are still, as we have ever been, foremost. Yet, if in this fraternal race we are to be overtaken and passed, we shall have this cause of consolation—that we, by the example and through the agency of this Society, have trained *them* and qualified *them* for their triumph. But we are not to fall behind; such is not the destiny of New-York. Her glorious motto, "Excelsior," never forgotten by her sons, gives certain promise that she will never fail for lack of effort.

Do you ask what is here doing? I answer, this Society, with the scores of county societies which she has awakened into life, is calling into action an amount of intelligent enterprise that must result in continued and rapid progress. The arts are encouraged to lend their aid by the invention and manufacture of implements, which lessen the amount of labor and necessarily the cost of production; while science points out the laws which regulate growth, and thus teaches the husbandman how, at the least possible cost, to increase production.

But our State, in fostering these societies, has done still more; she has through this agency, taught the farmer the importance of

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training his sons, by special instruction, for the business of farming. And this sentiment thus called into action, has received from the State her further countenance and support by a liberal appropriation to establish the New-York State Agricultural College.

It is not necessary that I should speak to this audience of the necessity that such education should be provided; and it is perhaps unnecessary that I should say aught of the origin of this enterprise; but veneration for the memory of one whom we all honored and loved, prompts me to remind you that JOHN DELAFIELD was the head and front of the movement. It was he who obtained a charter from the State, and warmed up with some of his own zeal and enthusiasm those whom he associated with him. He, alas! is dead, and the establishment of the College has in consequence been long delayed; but the subject has once more been revived with vigor, and there is good reason to hope that before another year passes we can report the institution as being in operation. Who are the men most deeply interested in the enterprise? Let me tell you that of the trustees who manage its affairs, five are ex-Presidents, and nearly all are graduates of your Society.

Sir, when this College shall be in full and successful operation, the benefits which will flow from her to the farmers of the State can scarcely be overrated. The lessons there taught will not be confined to the students who enter her walls; each of them will in turn become an instructor, an example to all who live near him, and will thus scatter again some of that good seed, which, having ripened in his own mind, has brought forth good fruit.

I venture to say that there is no pursuit in which education, as bearing on the art, is more essential to great success. It is a mortifying fact that this is not realized in our country, but that our occupation is held here in less respect than anywhere else. Has a farmer a family of sons? How often is it that youths of brightest promise are sent from home, one to study a profession, and thus obtain perhaps a scanty and uncertain support; another seeks employment in commercial life, finds his way to the city, takes there an humble position, leading a treadmill sort of existence, which, however tiresome as it is, he still prefers to the

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laborious and truly independent life of the farmer brother left at home. Why is this? It is because the farmer ranks infinitely too low in popular estimation, as compared with those of other callings. His is regarded as a life of unthinking toil, where muscles alone, and not mind, are needed for success. When we shall demand and obtain for it that rank among the pursuits of life to which it is entitled, we shall enlist in its service more of mind and learning, and as a necessary consequence shall make more rapid advances.

Again let me say, that our thanks are heartily due for the countenance and aid of our State government, and in saying this I am sure I give utterance to the sentiments of every farmer present.

To a grateful heart what can render more pleasure than the opportunity to return a favor or kindness shown. We have this gratification. We have returned an hundredfold to the State by increasing her agricultural wealth—all that she has ever bestowed upon us. But we have placed her under obligations to us in another manner. Do you inquire how? Have we not given her one of our number for Governor?—lent, I should have said; for we cannot give up our claims on him, the statesman, the gentleman, the farmer, John A. King.

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REMARKS OF GOVERNOR KING.

Governor King said: He was not here to-night to make a speech or studied discourse; that had already been well and ably done by others. He had come, however, because he felt it his duty, as he esteemed it a high privilege to mingle with those who like himself, were cultivators of the soil. He loved the land and all its associations; they were ever true, and full of those healthy and sound influences which shape and form the character of a freeman. He had lived many, many happy years on the same land whose soil he had assisted in cultivating, and where he had planted the trees, whose cool and quiet shade he had long enjoyed. He had lived contentedly, temperately and independently, as a man should live who owns the land he tills and holds it free from all demands. He who thus lives, feels, thinks and acts as if he had a stake in the common weal—and he has, indeed, whose lot is cast in this favored State. Much is due to the public authorities for the aid which they have given, from time to time, to the cause of Agriculture, and its kindred science, Geology; and now, more recently, in the endowment of an Agricultural College, connected with an experimental farm, and by allotting to us these spacious rooms which we this evening dedicate to the cause of Agriculture. Let us then, as farmers, take care that the work already so well begun receive no check. To us is the appeal now made to sustain and carry forward to a successful result, an institution which is, and is to be, all our own; a College, whose influence, if prudently and wisely exercised, must be of a sound and elevating character to the youth of the country. Who thinks more calmly, for he has time for reflection; who decides more safely, more intelligently and firmly, when the public interest demands the exercise of the best powers of the mind, than the farmer? For them, and by their steady and united aid, should the College be sustained. Its halls are to receive their sons for instruction; its

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fields and meadows are to be tilled and made productive by their labor; and having finished their course of study and employment, they will go forth in each returning year, to spread broadcast the principles of a sound, practical agricultural education.

Farmers of New-York, it is for you, and you alone, to add to the fund by which so much good is to be accomplished. Be as true to your calling as others are to theirs; work and give, for it is the cause of agriculture—the basis of your own and the country's independence, which is to receive your aid; to be returned tenfold by the clear heads and sturdy arms, which will be ever ready to vindicate the cause and the instruction, of which they themselves are the acknowledged recipients.

Farmers of New-York, you constitute the great body of its intelligent and useful citizens; on you emphatically devolves the duty of advancing and protecting your own great interest and occupation. As you shall perform that duty, so will you prove yourselves worthy of the name you bear, of the occupation you pursue, and the true guardians of the great and vital interests of the Republic.

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REMARKS OF HON. HARVEY BALDWIN.

MR. PRESIDENT *and Gentlemen of the Society:*

After the very able and eloquent addresses to which we have all listened with so much profit and delight, it would seem to be the work, not only of supererogation, but of downright presumption, to attempt too add a single word or syllable; and yet so impressed am I with the importance of the occasion, that I can not forbear to lay upon the approving altar my humble tribute. From the earliest history of man to the present time, whether in his savage or civilized state, has it been customary to erect and dedicate buildings to public use; and these, in their number and character, have ever marked, and will ever continue to mark, his progress in civilization. The simple habits of the savage require only the council house, constructed of the rudest material and in the rudest manner, for the assembling of their chiefs and the transaction of their public business; and the solitude, the dark shades of the deep forest canopied by high Heaveh, serve him as a temple for the worship of the Great Spirit. While man, civilized and christianized man, requires the school house, the academy, the college, the State house, with all its concomitant structures, and spacious churches with their tall spires pointing heavenward, for the adoration and worship of the Ever Living God.

The spot on which we stand, the scenes by which we are surrounded, this time-honored city, illustrate the truth of these remarks. On yonder proud eminence stands our ancient Capitol, over whose lofty spire and dome float, where may they ever float, our glorious stripes and stars; while in front that magnificent marble structure, of just and beautiful proportions, serves for the accommodation of all the other branches of government, save only that which has been so long neglected, and which is the parent of them all. Strange indeed is this neglect, the

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neglect of a department upon which, in the broadest acceptation of the term, rest all the arts and sciences, and in short everything that gives life, character, dignity and employment to man. But thanks to the Legislature that made the grant; thanks to our public servants, and especially to those into whose hands the work was committed; thanks to our noble State that she has been at length aroused from her lethargy to a sense of duty, and has erected for the Department of Agriculture this noble edifice, for the dedication of which we are this evening assembled. Standing in foreground of States, it was well for us, though late, to set this high example—an example which, as has been well remarked, will be emulated by others, and will shed its benign influence over our entire Union.

Here, Sir, within these walls, will be opened the great book of Nature; here will be elucidated and explained the mysterious machinery and eternal laws by which it is governed; here will, from time to time, be collected the richest products of nature and of art; here will be deposited the choicest specimens of the mineral, the vegetable and the animal kingdoms; and hither will be brought the most approved agricultural implements and machinery—while upon the shelves of your extensive and well assorted Library, and especially in the Transactions of your Society, will be found the best advice as to their adaptation and use, and the most ample instructions in every department of this noble science. Here Experience and Science and Philosophy will deposit their rich results; here Poetry will bring her choicest flowers, and Eloquence pay its highest tribute; and here Religion, pure and undefiled, will exhibit the emblems of her faith, and the lights of her path; and here, too, led by Nature, up to Nature's God, man will be improved—will be made a wiser and a better man.

And here, Sir, will assemble the intelligent farmers, not only of our own State, but from every other State in this great confederacy, to gather instruction from this grand fountain of knowledge; to it, the votaries of other climes will make a pilgrimage to pay their homage and carry back its rich instruction to improve, fructify and gladden other lands. To these high and holy purposes then, let us now and forever consecrate this noble edifice. Sir, if permitted to indulge in metaphor, I would that within

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these spacious halls, there should be erected high and sacred altars, on whose entablatures there should ever burn, with increased and increasing effulgence, the vestal fires of pure religion, virtue, temperance, knowledge, patriotism, liberty and independence. And that these altars and their sacred fires, together with this noble structure, should all be dedicated to union, to concord, to progress, to peace and to happiness. Yes, Sir, to the union of the States—to the concord of the States—to the progress of the States, and to the peace and happiness of the world. I congratulate you, Sir, and I congratulate the members of the New-York State Agricultural Society, upon the auspices of this day. It is a proud epoch in its history, and stamps it with progress and perpetuity; an epoch that will keep alive, in all time to come, a growing attachment to the great and glorious cause in which we have so long, so patiently and so successfully labored; and which, with its kindred institution, the Agricultural College, now just and well organized, will serve as sheet anchors—as sure pledges of all our hopes and future prospects.

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REPORT ON FARMS.

The President and Secretary who visited Mr. Solomon Walrath's farm, the only farm, they regret to say, offered for the premiums of the Society, respectfully report:

That they visited Mr. Walrath's farm, situate in Canton, St. Lawrence county, on the 22d and 23d of July last. Mr. Walrath's farm contains 60 acres. He came into possession of this farm fifteen years since, when the country was an unbroken wilderness, and no road but that cut as he progressed to the farm. The land, like that section of the State generally, was very heavily timbered.

We found the farm in a very good state of cultivation; the stumps of the trees removed from the cultivated fields, and the farm divided into convenient lots with stone fences, to a considerable extent, and with an excellent farm house, painted and finished in a manner that would not suffer with the best cottage dwellings in the larger villages of the county.

In laying his stone walls, Mr. Walrath places his drains under them, so that the work is much cheaper done and the walls are benefited by having the moisture removed. The stones from the farm (and there were many,) were all removed, and mostly placed in the fences.

The soil generally is gravelly; about ten acres of muck swamp on the banks of the stream through the farm. This is the manure reservoir, which is used in compost with the barn yard manure as needed, and the crops show that this part of the farmer's appropriate work had not been overlooked.

Mr. Walrath cultivates hops to a considerable extent, and we have seldom seen finer fields and in a more cleanly condition than those upon Mr. Walrath's farm. We saw many fields of hops in our passage to Canton, but none that compared with Mr. Walrath's.

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Mr. Johnson visited Mr. Walrath's farm again, when he was gathering in hops, and the crop for the season was a good one—the hops fine and brought the highest price in New-York, as advised by the factor who sold the crop.

In addition to hops, Mr. Walrath raises spring wheat, oats, corn, potatoes, &c., all of which are cultivated with care and success.

Mr. Walrath uses guano on his hops, which he mixes with lime, ashes and salt, in composition, and finds it very useful.

We were shown in the wheat and oats the ravages of the mice, which had eaten off, as estimated, nearly one sixth of the crop. They had never been discovered before this year and means were being taken to dispose of them.

Mr. Walrath's farm is almost entirely free of weeds, while farms around him, and the public roads are filled with Canada thistles. He showed us a thistle-puller, which he uses to pull up the thistle as it appears, and in this way he has subdued them so that with very little trouble he keeps his farm free from them. This also answers for all other weeds. The instrument is very simple; one was made for the Society and is to be seen in the Museum.

Mr. Walrath's hop-house and heating and bagging operators are very convenient, and enable him to prepare his hops in good condition for market.

Mr. Walrath raises the long pink eye potatoes in purity, and of admirable quality. He has never had the disease with them. Potatoes are dug when ripe and dry, put into a dark cellar on the bottom, in Octobor—potatoes planted on dry land—uses a composition of ashes, plaster, salt, and muck for his potatoes—never has had rot in the hill or in the cellar. The potatoes keep fresh and fine as we tested when at his house. Mr. Walrath keeps a regular book of expense for all his operations, very complete.

Mr. Walrath calculates the expense per ton to fit hops for market at $40. This is the result of several years' experience.

We found the dairy arrangements for the family excellent, as we were enabled to testify by the articles presented.

Mr. Walrath had in his sitting room the Agricultural Journals, showing that he was on the alert to avail himself of all the

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improvements of the day as far as in his power. His motto is to do all things well, to adopt such measures as will reduce expenses and increase his crops; and he brings to his aid the best implements he can find—and endeavors by saving labor machines to reduce his expenses.

His farm is in fine order, and is managed with much good judgment—everything indicating the thrifty, improving farmer. Considering the state in which Mr. Walrath took this farm in the wilderness 15 years since, and the condition in which it now is, he is entitled to much credit for what has been done, and we recommend that a premium be awarded him of thirty dollars.

T. S. FAXTON, *President.*

B. P. JOHNSON, *Cor'g Secretary.*

Rensselaer Falls, Dec. 1856.

HON. B. P. JOHNSON, *Secretary of N. Y. State Ag'l Society.*

Sir—I forward to you a report on my farming operations, which are some of my reflections, the results of years of agricultural reading, observation and experience.

Very respectfully, yours,

SOLOMON WALRATH.

STATEMENT OF SOLOMON WALRATH.

To the Committee on Farms:

Gentlemen—The farm which I occupy is situated in the town of Canton, County of St. Lawrence. The land rises gently from the river St. Lawrence to the great table land which is the source of the Oswegatchie, La Grasse, Raquette, Hudson, East and West Canada creeks, and numerous other streams which water the valleys of the St. Lawrence, the Mohawk and the Hudson. Locally considered, my land lies between the Oswegatchie and the La Grasse, and has a southerly slope towards Mud Creek, and the waters drained from it mingle with the Oswegatchie, and empty into the St. Lawrence at Ogdensburgh.

The land is what is called level; having no slopes that cannot be cultivated by the plow, or reached with a team for the purpose of spreading manure or gathering the crops.

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The primitive forest consisted of maple, basswood, hemlock and scattering pines on the most elevated parts, and of ash, oak and elm on the intervales. The timber on the highest lands was large and tall, and took deep root in the earth, so that windfalls made a deep excavation. On the intervales the timber was less in size and the roots spread out, so that whenever the trees were blown down the excavation was broad but not deep.

These marked characteristics afforded a good suggestion for investigation with a view to the improvement of the soil. The highest lands, on examination, were found to be silicious, loamy and gravelly, mixed with small cobble stones, and covered with vegetable mold to the depth of three or four inches. The soil and subsoil were loose and porous, and presented no obstruction to the penetration of the roots of vegetables.

The intervales had a deeper coating of vegetable mold, from six to ten inches in depth, caused by the decomposition of the earth and the admixture of decaying vegetables. Under this soil there lay a stratum of hard, close, compact earth, nearly if not quite impervious to water, which operated unfavorably upon crops in both wet and dry seasons. In wet seasons the water accumulated and soured in the soil. In dry periods it checked the ascent of moisture from below, in accordance with the universal law of equilibrium of watery as well as aerial fluids. This compact stratum, which may be called hard pan, seems to have been formed by the partial decomposition and infiltration of the more soluble parts of the earth among the more insoluble, by the action of water, and constitutes a body nearly impervious to the roots of vegetables; and was of a thickness of four to eight inches. In the lowest places, where the water accumulated most and continued longest, there the hard crust was deepest and gradually diminished in thickness till it wholly disappeared on elevated grounds, where the water passed off more rapidly. After passing through this crust, the earth is loose marl, sand and gravel, to the depth of fifteen feet, when there is a mixture of blue clay and rubble stones.

The farm consists of sixty acres: five acres in the highways and occupied by buildings and yards, twenty acres of wood and uncultivated, ten of pasture, six in hops, ten in meadow, and eight in grain lands.

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My farming operations, on this place, commenced in the spring of 1839, when the earth was to be reclaimed from the primitive forest. The process was naturally slow and toilsome. The forest, when removed, left the earth obstructed by stumps and roots that required time and labor to reduce the land to a condition capable of good husbandry. In addition to these hindrances, the soil was mixed with sandstones that required great labor in digging and removing from cultivated fields. The process could not be performed in any one year, even to a limited extent, without a sacrifice of time and money, and this labor must be performed before any efficient attempt at subsoiling and thorough cultivation could be made with present profit and a fair prospect of future improvement. I adopted a plan of gradual improvement, both in clearing and breaking the subsoil, which has been successful and brought its annual rewards. The hard crust which underlaid the native soil was attacked by gradual and persistent assaults, year by year, carrying the plow a little deeper each successive season, and allowing the new matter brought up time to slack by the influence of air and water, and to form a homogeneous mass with the soil. In this manner, and by successful assaults, the crust of hard pan has been broken and made part of the soil on all my cultivated lands, and the soil greatly improved. Formerly my crop of wheat averaged ten or twelve bushels, and my corn did not exceed twenty or twenty-five bushels per acre. Now, on same land, where the hard crust has been thoroughly broken and mingled with the soil, my wheat averages twenty bushels or over, and my corn averages full sixty, and sometimes amounts to eighty bushels per acre. My meadows, which were formerly liable to fail in dry seasons, and be hardly worth mowing, now yield large and uniform crops of two or three tons to the acre.

Every man must adopt his mode of improvement, to his means as well as to his soil, in order to reach a satisfactory result. The soil on which I have operated being stony, gravelly and loose on the highest parts, needed no sub-soiling. Here the labor and expense was that of clearing from stone, pulverizing and enriching. On the slopes and in the intervales, the natural soil was underlaid by a hard compact formation of little depth that required breaking and pulverizing to improve the crop and insure its certainty. The best method, under the circumstances, is supposed

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The primitive forest consisted of maple, basswood, hemlock and scattering pines on the most elevated parts, and of ash, oak and elm on the intervales. The timber on the highest lands was large and tall, and took deep root in the earth, so that windfalls made a deep excavation. On the intervales the timber was less in size and the roots spread out, so that whenever the trees were blown down the excavation was broad but not deep.

These marked characteristics afforded a good suggestion for investigation with a view to the improvement of the soil. The highest lands, on examination, were found to be silicious, loamy and gravelly, mixed with small cobble stones, and covered with vegetable mold to the depth of three or four inches. The soil and subsoil were loose and porous, and presented no obstruction to the penetration of the roots of vegetables.

The intervales had a deeper coating of vegetable mold, from six to ten inches in depth, caused by the decomposition of the earth and the admixture of decaying vegetables. Under this soil there lay a stratum of hard, close, compact earth, nearly if not quite impervious to water, which operated unfavorably upon crops in both wet and dry seasons. In wet seasons the water accumulated and soured in the soil. In dry periods it checked the ascent of moisture from below, in accordance with the universal law of equilibrium of watery as well as aerial fluids. This compact stratum, which may be called hard pan, seems to have been formed by the partial decomposition and infiltration of the more soluble parts of the earth among the more insoluble, by the action of water, and constitutes a body nearly impervious to the roots of vegetables; and was of a thickness of four to eight inches. In the lowest places, where the water accumulated most and continued longest, there the hard crust was deepest and gradually diminished in thickness till it wholly disappeared on elevated grounds, where the water passed off more rapidly. After passing through this crust, the earth is loose marl, sand and gravel, to the depth of fifteen [illegible] when there is a mixture of blue clay and rubble stone.

The farm [illegible] of sixty acres: five acres in the [illegible] and [illegible] lings and yards, twenty acres of [illegible] pasture, six in hops, ten in [illegible]

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... commenced in the sum... ... from the primitive ... toilsome. The fore... ... stumps and roots ... to a condition ca... ... these hindrances ... great labor ... The process could ... limited extent ... labor must ... and thorough ... and a fair proper ... of gradual improvem... ... subsoil, which has ... and ... rewards. The hard crust ... laid the ... was attacked by gradual ... assaults year after year, carrying the plow a little ... cessive ... the new matter brought ... slack by the influence of air and water, and to form ... mass with the soil. In this manner, and by ... the crust of hard pan has been broken and ... on all my cultivated lands, and the soil great... merly my crop of wheat averaged ten or tw... corn did not exceed twenty or twenty-five ... on same land, where the hard crust has ... and mingled with the soil, my wheat av... over, and my corn averages full sixty ... eighty bushels per acre. My meadow... ble to fail in dry seasons, and he ha... large and uniform crops of two or ...

Every man must adopt his m... as well as to his soil, in order ... soil on which I have operat... the highest parts, needed ... expense was that of cl... ing. On the slopes ... underlaid by a hard ... red breaking and pl... certainty. The best ...

... the same ... expense ... of two ... was used ... annual ... bushels ... and cur... the first ... and yearly ... without manure. ... feet and a half ... red and rolled in ... surface about a foot ... As soon as they are ... be run through the ... manure applied to the ... be repeated as often as ... the potatoes gain such ... defiance to their ambi... ...d, which averages about ... should be dug in fair weather ... frosts occur, if practicable, ... then gather and keep in a ... gement I have had no trouble ... als during all the seasons that

to have been adopted. For had the land been thoroughly cleaned and sub-soiled in one season, it would have required an amount of labor and manure that could not he afforded; while, by the gradual process, fair crops have been obtained at moderate expense. The cost of clearing the land of stumps, roots and stones, and the manure necessary for each acre, thoroughly prepared and sub-soiled, could not be estimated at less than thirty dollars per acre; which is an amount of expense that can only be incurred by those who make farming a pastime without regard to profits.

In the intervales and natural water-ways, on my farm, the hard crust was thickest. There the water in the spring and the drouth of summer were alike unfavorable to vegetation of any valuable kind. In order to remedy these evils I commenced a system of blind drains, of a width and depth proportioned to the water that might be expected to pass through them. They are from three to six feet deep, and the width is from two to three feet. Stone are laid on the sides of the drain at the bottom, from six to ten inches high, and covered by flat stone. The ditch is then filled up with small loose stone, within a foot and a half of the top. Straw is laid over the stone to prevent the earth from obstructing the drain, and the soil dug from the drain filled in. The result has been most satisfactory. Lands that were formerly useless are made the most productive spots on the farm, and the adjacent soil quickened. I have about two hundred rods of these drains constructed at an expense of about fifty cents per rod.

I make a compost heap annually of one hundred to one hundred and fifty loads. The hop vines and other vegetable substances that are not useful for feeding stock are gathered in the fall and placed in the centre of the barn yard. Straw and other coarse fodder is scattered over it and the animals feed and tramp it down during the winter. In the spring when the frost is out, the heap is gathered and covered with muck from a neighboring creek, and additions made to the heap during the summer, of such materials as will increase its value. Salt is added to the heap before and after the muck, for the purpose of retaining moisture as well as for its fertilizing properties in small quantities. When the heap is formed the soap suds and other waste waters are thrown upon it, to keep it moist and prevent the escape of gases,

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which constitute an important element of manures. In the fall this compost is used on the hop field for a top dressing, to enrich the soil and shield the roots from the action of frost.

I also make a composition of six bushels of house ashes, one bushel of plaster, one bushel of slacked lime, and one fourth bushel of salt, a small quantity of sulphur, pounded bones, &c. This is used for a top dressing. It is sown broad cast, on grain and meadows. On grain it should be sowed soon after the grain is up. On meadows as early as practicable after the grass shoots up in the spring, and before a rain if practicable. On corn it is applied before and after hoeing. On potatoes it is applied to the hill at the time of hoeing, and slightly covered, and in the same manner on gardens. This composition was made at an expense of about twenty cents per bushel, and used at the rate of two to three bushels per acre, on grain and meadows.

This composition, with a small addition of guano, was used upon about an acre, constantly cultivated for ten years, without other manures, and the result was a constantly increasing annual product. The last crop was wheat, and the yield thirty bushels per acre. It was then seeded with clover and timothy, and during the past season it has produced two crops of hay; the first of two the second of one ton.

The potatoes that I cultivate are pink eyes and peachblows; the ground is prepared by plowing and harrowing without manure. The field is then marked out for the rows, three feet and a half apart, and the potatoes, having been quartered and rolled in plaster, are immediately dropped on the surface about a foot apart, and covered with the plow or hoe. As soon as they are fairly above ground, the cultivator should be run through the rows, the hills weeded, the composition of manure applied to the hills with a spoon, and this process should be repeated as often as is necessary to keep down the weeds, till the potatoes gain such development as to shade the soil and bid defiance to their ambitious enemies. When the crop is formed, which averages about two hundred bushels per acre, they should be dug in fair weather before the autumnal rains or heavy frosts occur, if practicable, and dried in a field before gathering; then gather and keep in a dry, dark cellar. Under this management I have had no trouble with rot—not having lost five bushels during all the seasons that

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have caused so much trouble and loss. The custom of many is to gather their potatoes in heaps in the field, and cover with potato tops, the worst of all covering. The potatoes continue damp, and are exposed to air that is calculated to promote the process of decomposition, and when the rot is once begun all efforts to check it are of little avail.

In the cultivation of corn, I plow the land as early as practicable in the spring, and again near the time for planting, and mellow the soil with the cultivator. When the ground becomes sufficiently warm, I mark the field for hills about three feet and a half apart, and plant. As soon as the plants are fairly above ground I apply the composition before spoken of to the hills, and run the cultivator through the rows both ways, weed the hills and loosen the earth with the hoe if necessary. The composition is applied once or twice afterwards, and the cultivator and weeding repeated as often as may be necessary to destroy the weeds and keep the earth light and mellow. In this way, at an expense for manure not exceeding sixty or sixty-five cents per acre, I have had full crops of corn averaging about fifty bushels per acre.

The stalks are cut at the root soon after the corn is glazed and stooked to cure in the field. They are carried to the barn to be husked at the proper time, and the stalks or husks may be saved in a condition sweet and free from mold, and affording a most tempting food for stock by spreading them in alternate layers with straw or hay, that will absorb the moisture and complete the process of curing.

In the cultivation of wheat, I sow what is known here as Scotch wheat, after corn, potatoes or peas, two bushels per acre. The ground is prepared by plowing in the fall and again in the spring, as early as practicable. After the sowing the ground is mellowed, and the grain covered by the harrow or cultivator, and sometimes by both, if necessary, and then rolled. If the earth is dry roll immediately; if not, it is better to postpone the rolling till the wheat comes up.

After the wheat appears, I sow two to three bushels to the acre, of the top dressing already described. If any weeds or thistles appear in the field, they should be eradicated before they attain a size to overshadow and check the growth of the wheat.

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With this care, nature develops and matures the crop, and it needs but little attention till fit to harvest.

I harvest my wheat soon after the color changes and while the joints are green, bind immediately after the cradle, stook and cap, and let the grain and straw cure in the field till they are fit for the mow. There are several advantages in this method: Firstly, it does not shell, and little or none of the grain is wasted; secondly, the straw is more palatable and nutritious to stock; thirdly, the wheat is better in appearance, and affords more and better flour. During the past season I left a portion of a field, sowed with the same seed upon the same day, for ten days, and the early and the latter harvesting were kept separate. The difference in the two samples were so marked that an experienced miller, who regarded them as two kinds of grain, considered the early gathered grain worth a shilling a bushel more than the other. The same management of other grains, as I apply to wheat, will be equally successful. My average crop of oats has been about fifty-five bushels, and of peas twenty-five bushels per acre.

I have labored under some disadvantages in the cultivation of hops, from want of experience and defects of soil. Hops require a deep loose soil, as the roots are large and if not enabled to strike deep, they spread out laterally and are cut and broken by the plow in cultivation, and the growth retarded or suspended. To avoid these difficulties, where the soil is not naturally adapted to their growth, the ground should be sub-soiled and enriched to the depth of twenty inches. This preparation will take three years. The ground may be cultivated in corn or potatoes during the time, but no weeds should be allowed to form seeds. When the ground is fitted, the roots should be prepared by an experienced planter, two joints to a root and two roots to a hill. The hills should be seven feet apart. I make a hole with a round stick sharpened, and set the roots six inches apart, cover four inches with earth, and place a stake at each hill. The ground should be kept carefully weeded about the hills, and the vines appear in about a month. The land during the season of planting should be cultivated in potatoes, as corn would shade the plants too much, and there will be no hops worth poling. The next season after planting they are to be poled, two poles to a

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hill, sixteen to eighteen feet long. The first care in the spring, is to remove the compost from the hills, and as soon as the frost is out of the ground the poles are set near the vines and eighteen inches apart, and the land plowed both ways, turning the furrows from the hills, and the hills dressed by cutting off the runners near the main root. Two vines are to be trained on each pole, and the surplus clipped off. When the vines are about three feet high, the spaces between the rows are to be plowed from the hills; after that the cultivator is used as often as necessary to keep the soil mellow and destroy the weeds. When the plants attain a vigorous growth, they will throw out a surplus of roots and shoots. These should be carefully trimmed during the month of June, by an experienced hand, who will be careful to avoid interference with the main roots and branches. About the first of July the furrow is turned towards the hills by the plow, and the hills earthed up by the hoe.

The hop plants are male and female. The male is striped with red, and should be marked and located in different parts of the field, from twelve to sixteen hills per acre, so that the pollen may reach the female plant in every part of the field. While the hops are forming from the first of July to the first of August, no cultivation is admissible. After the hops are formed the earth is loosened between the rows with the cultivator, and the ground kept mellow while the hops are growing.

The hops are matured about the first of September, and are ready for gathering. When the harvesting is commenced, large boxes are placed in the field; a man takes down the poles, brings them near the boxes, places them on stools, separates the clusters and brings them to the girls, who pick them off the vines and drop them into the box. Care must be taken that no dead hops, leaves, vines or pieces of bark, from the poles, be allowed to enter the box. The contents of the boxes are shoveled into sacks every night, taken to the kiln, spread evenly on the cloth over the room where the fire is kept. They are then heated by a moderate fire till the sweating process is passed and the hops begin to open; then the fire may be increased and maintained till the hops are dry. They should not be stirred during the process. When the stem of the hop breaks in your fingers the cure is complete, and they are left to cool on the kiln, and

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then shoveled into the store-house. After lying in the store-house for two weeks, they may be pressed into bales and prepared for market.

My average crop of hops has been about eight hundred pounds per acre. I measured half an acre the past season that produced five hundred and ten pounds, and my crop sold for ten cents and a half in New-York. The expense of raising hops is about eight cents per pound.

The insect that is most troublesome and destructive to wheat, in this country, is the *Midge*, a small fly one-fourth, to one-sixth of an inch in length; its body is slim, of a pale yellow color and surrounded by dark brown rings. Its wings are thin as gossamer, and its motions so graceful that it is almost invisible on the wing. The ova, which are deposited in the blossoms of wheat and other flowers, when examined under a magnifying glass, have a striking resemblance, in color and form, to the parent. These insects like all others, make ample provisions for perpetuating the species, but like other animated beings, they have their periods of pros perity and adversity, and the rains of Autumn, and the snows and frosts of winter destroy many of them; so that in the spring they come out in feeble colonies, instead of the swarming hordes of autumn. The ova soon hatch into delicate worms, that spin a web, like the silk worm, and let themselves down from their birth place to the earth, when the time and manner of their metamor phosis is unknown. But it is not supposed to be long, as those who watch the insects will find that they rapidly accumulate and work upon red clover and some other flowers when the wheat season has passed. Hence it is to be inferred that early sowing affords the most probable mode of avoiding their destructive assaults upon the wheat crop.

The wire worm has been injurious to many crops for several years. It attacks potatoes and the roots of most kinds of grain. About eight years ago I sowed a barrel of salt, in which I mixed three pounds of arsenic, upon about three-quarters of an acre of land, badly infested with wire worms. I plowed the salt in and dragged the ground; and in three or four days I plowed the ground again and planted it with corn, and the crop was uninjured by the worm, and produced about eighty bushels per acre. In my later experience, I find that the wire worm is not partial

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to clover or peas, and when they have become troublesome I seed down with clover and the worms uniformly disappear. There are several other kinds of flies, grubs and worms that affect the crops, but these are the most troublesome and destructive in this section.

The grasses that I cultivate are clover and herds grass. I sow sixteen pound of clover seed when used alone, and when mixed I sow four pounds of clover with eight quarts of timothy seed per acre. It may be sowed either in the fall or spring, according to the crop, but should be sowed early in order to attain a strong root before the summer drouths come on. For dairy purposes white clover is the best, and is natural to our soil and flourishes without care or culture.

For two years past I have mowed only six acres, producing an average yield of about two and a half tons per acre. My time for cutting clover is when the heads begin to change color. It is wilted and put into small cocks, where it is allowed to stand and make in the air. When it is thoroughly cured it is opened and aired previous to being mowed in the barn.

I do not salt my hay, as observation has convinced me that it retains moisture which blackens and molds the hay, and makes it lesss nutritious and acceptable to the animals. I keep salt where my cattle can have free access to it, and observe that in the spring and summer when the grasses are juicy and the weather warm, they resort to it frequently, while in cold weather it is rarely touched. This dictate of instinct is in conformity to human observation. In high latitudes salted provisions have been found subversive of the laws of human health and life, while in tropical regions, and during the hot seasons in temperate latitudes, salt is a valuable addition to the food of men and animals.

The weeds most troublesome are Canada thistles, kale, white daisy, yellow dock, burdock, and a variety of other weeds, that require the constant attention of the farmer. The most troublesome of all is the Canada thistle, which grows with wings that are ready to raise the seeds in the air and waft them on every breeze. The only mode of eradicating thistles and other weeds is by thorough cultivation. No plant grows vigorously without a root in the soil, and leaves and branches in the air, to carry on the great process of decomposition and absorption of the elements essential to nutrition and growth. If the roots of plants are

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destroyed, the top dies inevitably in the open air. If the top is destroyed the root may sprout again and again, but whenever the top can be cut below the earth's surface, it generally destroys both root and branch. It is necessary to know the tenacity of life in the different vegetables, in order to attack them successfully. My method of killing thistles has been by frequently cutting off the tops, and depriving them of atmospheric support. They resist my assaults with great tenacity, but in two or three years they yield the contest and disappear from the field. The few stragglers that remain, after the general warfare, are followed up by "The Thistle Puller," and eradicated, root and branch.

My stock consists of a span of horses, three cows, and ten sheep. The neat cattle are common breeds. The sheep are a cross of the Merino and South Down. My sheep average from four to five pounds of wool per head, which brings about thirty-eight cents per pound. The annual increase generally doubles the flock. The old sheep bring about five dollars a head, and the lambs two and a half.

I usually buy two pigs in the spring. They are fed on milk at first, but after a few weeks I boil roots, add meal and milk and allow fermentation to take place before feeding. The animals are confined in a pen, and kept clean as possible and supplied with all the food they will eat. Experience has convinced me that the pig is the only animal whose idle life is more profitable to the farmer than one of industry. If he is allowed to shift for himself he learns habits of mischief, and becomes a loafer of the first class, lean, lank and careless of appearances, and ready to prey upon the unwary and unsuspecting by night and day. These swine are kept till they are eight or nine months old, and when slaughtered generally exceed three hundred pounds each.

Carrots are the most sure of the root crops, and the best for animals in this country.

My orchard was commenced with trees from Rochester, which failed. I have since set trees, grafted on seedlings, which thrive well and begin to bear. I wash the trees with soap suds every spring, and the bark is smooth and the growth vigorous.

I have one hundred and sixty rods of stone wall, three feet wide at bottom, twenty inches at top, and four feet and a half

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high, built at a cost of about one dollar and a quarter per rod. I have seventy-five rods of board fence that cost about the same per rod as the wall, and two hundred rods of rail fence that cost about sixty-two and a half cents per rod.

The house is of wood, twenty-eight by thirty eight feet on the ground, one and a half stories in height, clap-boarded and painted white on the outside, the roof covered with pine shingles, and the windows shaded with green blinds. The inside is sheathed, lathed, plastered, painted and papered. The lower floor is divided into three rooms, a clothes press and stair way, and the chamber is divided into two rooms with similar finish. Attached to the house is a wing, eighteen by twenty-eight, a story and a half high, and finished like the main building on the outside. It is divided into a kitchen, pantry and wood-house on the lower floor, and a large lodging room overhead. I have a cellar under the main body of the house with a double wall laid in mortar, that is proof against frost and rats. Under the kitchen is a cistern, built of brick and water lime, of the capacity of one hundred barrels, which affords an unfailing supply of soft water. The cost of the buildings was about eight hundred dollars.

The stock barn is sixty by twenty-six feet on the ground, with sixteen feet posts. It is boarded up and down with inch boards, lined with half inch stuff, the roof covered with pine shingles. Two-thirds of the lower part is devoted to stables with a hall in the center. The other part is formed into a carriage house. The loft over the stables is used for storing hay, and that over the carriage house for grain. There is a creek near the barn that is used to water the stock. The cost of building was about three hundred dollars. There is an old barn on the place, built before the farm was purchased, and worth about seventy-five dollars.

The hop-house is twenty-six by thirty-six feet, with fourteen feet posts, clapboarded with pine on the outside, and the roof shingled. One half of the upper part is used for a store-house, and the other half for a kiln to dry hops.

The kiln is lathed and plastered on the sides. Over head joists run across the building every three feet; these are covered with slats two inches wide, one and a quarter thick, placed two inches apart and running towards the store room, and covered

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with cloth. The heat is generated by two stoves, below the cloth, and sufficient pipe to allow the radiation of most of the heat, but no pipe should be allowed nearer than six feet to the cloth, lest the heat should scorch and damage the hops.

Ventilation in the sides or roof is necessary to secure a free current of air over the hops while drying, to carry off the moisture as fast as it rises into the air of the room.

The basement, when not needed for curing hops, is used for storing the implements used in gathering and curing them, and for other tools. The cost of the building, with the apparatus for curing and packing hops, was about two hundred and fifty dollars.

Estimate of property for January 1st, 1856:

Value of Horses,	$275
" Neat cattle,	50
" Sheep,	30
" Hay,	96
" Grain and other products,	564
" Farm implements,	140
" Wagons and harness,	175
Cost of repairs to fences,	3
" Labor,	200
" Board for laborers,	50
Value of our own time and board,	150
" for members of family,	25
Backsmith's bill,	16
Cost of implements purchased,	15
	$1,789

Estimate of property for January 1st, 1857:

Value of Horses on hand,	$250
" Neat cattle,	50
" Sheep,	30
" Hay,	160
" Grain and other products,	250
" Farm implements,	150
" Wagons and harness,	175
Amount carried forward,	$1,065

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Amount bro't forward,	$1,065
Value of Cow sold,	40
" Hay sold,	35
" Grain and other products sold,	1,125
" Butter,	10
	$2,275
	1,789
	$468

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ESSAY,

ON THE PHYSICAL PROPERTIES OF SOILS AS AFFECTING FERTILITY.

BY SAMUEL W. JOHNSON,

Professor of Analytical and Agricultural Chemistry in Yale College, and Chemist to the State Agricultural Society of Connecticut.

The fertility of a soil depends upon no one cause or class of causes. The farmer who is acquainted with the results of generations of agricultural experience but who has not mastered the principles of science; the chemist who regards only the revelations of his reagents; the geologist who merely traces the soil to its original rock; the physicist who sees in it only a theater for the play of mechanical forces—can each suggest some of the conditions of fertility, and can account for the productiveness of this and the barrenness of that soil; but none of them can give accurate rules universally applicable to the valuation or improvement of soils in general. There is hardly another subject of such wide connection and extent. It involves the whole range of the physical sciences; Geology, Chemistry, Botany, Physiology, Meteorology, Mechanics, Hydrodynamics, the sciences of heat, light and electricity, all are intimately related to it. That labors to illustrate such a topic should have only recently met with any degree of success is not strange; neither are we to wonder that our present knowledge of it is very limited, or that the opinions of those best qualified to judge upon it, are divided.

The function of the soil is two-fold, first to serve as the station or home of the plant, and second, to supply it with food.

In nature these two offices are not by any means separable. The same materials that form the bed in which the plant preferably fixes itself, in which it extends its roots most naturally, and developes itself most healthfully, also contribute food to its growth.

The study of the physical characters of soils involves the investigation of the first of these functions, that of their chemical

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characters the investigation of the second. There are soils whose texture, situation, degree of moisture, &c., are apparently faultless, which are nevertheless unproductive; they lack some necessary form of food for the growing plant. There are other soils which reveal by chemical analysis the presence of every substance needed by the plant as food, and prove to contain them all in sufficient quantity, and yet are not productive, or not regularly so; they may give a fair crop one season and entirely fail the next. These soils have some physical defect which nullifies their excellencies of composition.

An advanced, and rational or scientific system of farming, keeps in view both the chemical and the physical qualities and wants of the soil, and reclaims and improves the lands under its control, by a judicious combination and succession of appropriate chemical and physical agencies. Thus in England and Scotland, countries which are the world's example in agriculture, the first thing that is done with a soil by a thorough farmer, is to inquire into its physical condition, and to correct the same when necessary and practicable. The British farmer will have his soil just so dry, just so deeply tilled, just so finely pulverized, before he feels warranted in putting seed into it, or manure upon it. In this country, however, where nature has favored us with a climate in some respects better, comparatively little attention is bestowed on the mechanical preparation of the ground, the usual routine of ploughing six inches, more or less, harrowing and rolling a traditional number of times, being all that generally succeeds the removal of forests and of stones. Beyond this simple preparation of the ground, which is uniform for nearly all soils and all crops, the farmer if he go farther, expends his strength in efforts to raise the fertility of his fields by chemical means—by the application of much and many manures.

It is quite plain, on a moment's thought, that physical improvements of the soil deserve to come first in order of time, because where they are needed, and not supplied, chemical improvements (manures) must fail to give the full effect proper to them. It is of the utmost importance for the farmer to be able to judge accurately how favorable to his purposes are the physical characters of any soil he proposes to occupy, and to know how to maintain these qualities of a new soil in their original excellence.

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The knowledge of the physical conditions which determine the fertility or barrenness of soils is an indispensable preparation to the study of the value and action of manures, and it is utterly impossible in practice, to derive adequate return from fertilizers, unless the soil either originally possesses, or has been brought into, a proper physical state.

These reasons have induced the writer to attempt presenting this subject anew, in the light of the latest and fullest investigations, and he is confident that it is possible thus to write one of the most practically useful chapters of agricultural science.

I. *The fineness of the particles* of a soil greatly influences its fertility. On the surface of a block of granite only a few lichens and mosses can exist; crush the block to a coarse powder and a more abundant vegetation can be supported on it; if it is reduced to a very fine dust and duly watered, even the cereal grains will grow and perfect fruit on it. Thus two soils may have the same chemical composition, and yet one be almost inexhaustibly fertile, and the other almost hopelessly barren. There are sandy soils in the Eastern states, which without manure yield only the most meagre crops of rye or buckwheat; and there are sandy soils in Ohio which without manure, yield on an average 80 bushels of Indian corn per acre, and have yielded this for twenty to fifty years in unbroken succession. According to David. A. Wells, (Am. Jour. of Science, July, 1852,) these two kinds of soil yield very similar, practically identical results on chemical analysis, so far as their inorganic ingredients are concerned. What is the cause of the difference of fertility? Our present knowledge can point to no other explanation than is furnished by the different fineness of the particles. The barren sandy soils consist in great part of coarse grains, while the Ohio soil is an exceedingly fine powder.

It is true as a general rule, that all fertile soils contain a large proportion of very fine or impalpable matter. How the extreme division of the particles of the soil is connected with its fertility it is not difficult to understand. The food of the plant must enter it in a state of solution, or if undissolved, the particles must be smaller than we can discover with the best optical aids, because the pores of the roots of plants are not discernible by any microscope. The mineral matters of the soil must be dis-

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solved or diffused in water. The rapidity of their solution is in direct proportion to the extent of their surface. The finer the particles, the more abundantly will the plant be supplied with its necessary nourishment. In the Scioto Valley soils, the water which is transpired by the crops, comes in contact with such an extent of surface that it is able to dissolve the soil-ingredients in as large quantity and as rapidly as the crop requires. In the coarse grained soils, this is not the case. Soluble matters, (manures) must be applied to them by the farmer, or his crops refuse to yield handsomely.

Again, it is obvious that the finer the particles of the soil, the more space the growing roots have in which to expand themselves, and the more numerously are they able to present their absorbent surfaces to the supplies which the soil contains.

Other advantages of fine soils will appear in the progress of this essay.

II. We will discuss *the power of the soil to absorb or condense gases or vapors.* With regard to this subject we have no actual observations on soils, of any great value. Those we do possess were made forty years ago by Schübler, then a teacher in Fellenberg's school at Hofwyl in Switzerland, and will be presently adduced.

In the first place may be considered those facts of science which bear upon the question before us. It is found that many solid bodies are able to condense gases upon their surface, or within their pores. Freshly burned box-wood charcoal thus absorbs ninety times its volume of ammonia gas, thirty-five of carbonic acid and nine of oxygen. Copper, iron, lead, platinum, and probably the other metals, also condense gases upon their surfaces. This condensation is scarcely perceptible in plates of solid metal; but when by chemical means these metals are produced in a very finely divided state, as fine powder or sponge, their surface attraction becomes manifested to an extraordinary degree. There is then, a physical attractive (adhesive) force which is exhibited with greater intensity, the greater the surface of the body possessing it. It is manifested by different bodies in very unlike degree, and is exerted with various energy towards different gases.

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Bodies which absorb the gas or vapor* of water are called hygroscopic. This property of a soil is of the utmost agricultural importance, because: 1st—it is connected with the permanent moisture which is necessary to vegetable existence, and, 2d—since the absorption of water-vapor determines the absorption of other vapors and gases.

In the following table from Schübler we have the results of a series of experiments carried out by that philosopher, for the purpose of determining the absorptive power of different kinds of earths and soils. He found that *dry* earths did not absorb oxygen; this is because being in constant contact with air they were saturated with this gas before the experiments begun; when however, the soil was wet with water, an absorption was found to occur. The first column of figures gives in thousandths the quantity of oxygen absorbed by the moist soil during thirty days; the second column the quantity, also in thousandths, of moisture absorbed by the previously dried soil, in twenty-four hours.

Quartz sand,	1	0
Gypsum,	1.7	1
Lime-sand,	4	3
Plough land,	10.5	23
Clay soil, (60 per cent. clay,)	6	28
Slaty marl,	7	33
Loam,	7	35
Fine carbonate of lime,	7	35
Heavy clay soil,(80 per cent. clay,)	9	41
Garden mould, (7. per cent. humus,)	11.5	52
Pure clay,	10	49
Carbonate of Magnesia, (fine powder,)	11	82
Humus,	13	120

It is seen, that with two exceptions, the rate of absorption for oxygen and for watery vapor increases in the same order. It is probable then that the oxygen was to some degree absorbed and held in solution by the water with which the earth was moistened. The two exceptions are soils rich in vegetable matter. (humus.) They absorbed proportionally more oxygen for a chemical reason; it united with their carbon and hydrogen, forming carbonic acid and water. Probably the larger share of the absorption of oxygen,

* The term *Gas* is applied to permanently æriform bodies—*Vapor* to such as readily assume a liquid state. The difference is only relative.

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in most cases, was due to this combination of it with the elements of humus, or with the protoxyd of iron, the latter passing thereby into the peroxyd; but in case of magnesia and carbonate of lime the absorption must have been a surface condensation.

An obvious practical result follows from the facts expressed in the above table, viz: that sandy soils which have little attractive force for watery vapor, and are therefore dry and arid, may be meliorated in this respect, by admixture with clay, or better with humus, as is done by green manuring. The table gives us proof that gypsum does not exert any beneficial action in consequence of attracting moisture. Humus, or decaying vegetable matter, it will be seen, surpasses every other ingredient of the soil in absorbing moisture. This is doubtless in some degree connected with its extraordinary porosity or amount of surface. How the extent of surface alone may act, is made evident by comparing the absorbent power of carbonate of lime, in the two states of sand, and of an impalpable powder. The latter it is seen, absorbed twelve times as much vapor of water as the former. Carbonate of magnesia stands next to humus, and it is worthy of note that it is a very light and fine powder.

Finally, it is a matter of observation that "silica and lime in the form of coarse sand, make the soil in which they predominate so dry and hot that vegetation perishes from want of moisture; when, however, they occur as fine dust, they form too wet a soil, in which plants perish from the opposite cause." (*Hamm's Landwirthschaft.*

III. *Permeability of the soil to water, including percolation and capillarity.*—A soil is permeable to water when it allows that liquid to soak into or run through it. To be permeable is of course to be porous. On the size of the pores depends its degree of permeability. Coarse sands and soils which have *few* but *large* pores or interspaces, allow water to run through them readily—water *percolates* them. When instead of running through, the water is largely absorbed and held by the soil, the latter is said to possess great *capillary power;* such a soil has *many* and *minute* pores. The cause of capillarity is the same surface attraction which has been already mentioned.

When a narrow vial is partly filled with water, it will be seen that the liquid adheres to its sides, and if it be not more than

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one-half inch in diameter, the surface of the liquid will be curved or concave. In a very narrow tube the liquid will rise to a considerable height. In these cases the surface attraction of the glass for the water, neutralizes or overcomes the weight of (earth's attraction for) the latter. The pores of a sponge raise and hold water in them, in the same way that these narrow (capillary*) tubes support it. When a body has pores so fine (surfaces so near each other,)that their surface attraction is greater than the gravitating tendency of water, then the body will suck up and hold water, will exhibit capillarity; a lump of salt or sugar, a lamp wick, are familiar examples. When the pores of a body are so large, (the surfaces so distant) that they cannot fill themselves, or keep themselves full, the body allows the water to *run* through or to *percolate.*

Sand is most easily permeable to water, and to a higher degree, the coarser its particles. Clay on the other hand is the least penetrable, and the less so, the purer and more plastic it is. In an agricultural sense, sand implies those coarse particles or grains whose form can be defined by the eye, while all the finer impalpable portions of a soil, though consisting in part of very fine grains of sand, may be called clay. The chemist, however, understands by clay a definite chemical compound. This distinction should be borne in mind. Sand, i. e. grains of quartz, or undecomposed rock, may be made so fine, that with the admixture of a little true clay, it opposes the passage of water to a considerable extent.

When a soil is too coarsely porous, it is said to be leachy or hungry. The rains that fall upon it, quickly soak through, and it shortly becomes dry. On such a soil, the manures that may be applied in the spring, are to a great degree washed down below the reach of vegetation, and in the droughts of summer, plants suffer and perish from want of moisture.

When the texture of a soil is too fine, its pores too small, as happens in a heavy clay, the rains penetrate it too slowly; they flow off the surface, if the latter be inclined, or remain as pools for days and even weeks, in the hollows.

In a soil of proper texture, the rains neither soak off into the under earth, nor stagnate on the surface; but the soil always

* From *capillus* the Latin word for hair, because as fine as a hair, (but a hair is no tube, as is often supposed.)

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(except in excessive wet or drought) maintains the moistness which is salutary to most of our cultivated plants.

What part the *capillarity* of the soil plays in the nutrition of the plant may now be noticed in detail.

If a wick be put into a lamp containing oil, the oil by capillary action gradually permeates its whole length, that which is above as well as that below the surface of the liquid. When the lamp is set burning, the oil at the flame is consumed, and as each particle disappears, its place is supplied by a new one, until the lamp is empty or the flame extinguished.

Something quite analogous occurs in the soil by which the plant (corresponding to the flame in our illustration) is fed. The soil is at once lamp and wick, and the *water of the soil* represents the oil. Let evaporation of water from the surface of the soil or of the plant, take place of the combustion of the oil from a wick, and the matter stands thus: Let us suppose dew or rain to have saturated the ground with moisture, for some depth. On recurrence of a dry atmosphere with sunshine and wind, the surface of the soil rapidly dries; but as each particle of water escapes, (by evaporation) into the atmosphere, its place is supplied (by capillarity) from the stores below. The ascending water brings along with it, the soluble matters of the soil, and thus the roots of plants are situated in a stream of their appropriate food. The movement proceeds in this way so long as the surface is dryer than the deeper soil. When by rain or otherwise, the surface is saturated, it is like letting a thin stream of oil run upon the apex of the lamp wick, no more evaporation into the air can occur, and consequently there is no longer any ascent of water; on the contrary, the water by its own weight penetrates the soil, and if the underlying ground be not saturated with moisture, as can happen where the subterranean fountains yield a meagre supply, then capillarity will aid gravity in its downward distribution. The water of the soil holds in solution the food of the plant—those portions at least which are absorbed by the roots. From the leaves of growing plants there is perpetually going on an enormous evaporation. Calculations founded on experiments of Hales and Saussure demonstrate that from an acre of sunflowers, each plant occupying four square feet of ground, there occurs during four months growth, the evaporation of four and a half

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millions pounds of water. This water comes from the soil and passes through the plant. All the mineral matters and a portion of the organic bodies, which feed the plant, are carried into it by this water. So long as evaporation goes on from the surface of the soil, so long there is a constant upward flow of saline matters. Those portions which do not enter vegetation accumulate on or near the surface of the ground; when a rain falls they are washed down again to a certain depth, and thus are kept constantly changing their place with the water which is the vehicle of their distribution. In regions where rain falls periodically or not at all, this upward flow of the soil water, often causes an accumulation of salts on the surface of the ground. Thus in Bengal, many soils which in the wet season produce the most luxuriant crops, during the rainless portion of the year become covered with white crusts of saltpeter. Doubtless the beds of nitrate of soda that are found in Peru have accumulated in the same manner. So in our western caves, the earth sheltered from rains, is saturated with salts—epsom salts, glauber salts and saltpeter or mixtures of these. Often the rich soil of gardens is slightly incrusted in this manner in our summer weather; but the saline matters are carried into the soil with the next rain.

It is easy to see how, in a good soil, capillarity thus acts in keeping the roots of plants constantly immersed in a stream of water or moisture that is now ascending, now descending, but never at rest, and how the food of the plant is thus made to circulate around the organs fitted for absorbing it.

The same causes that maintain this perpetual supply of water and food to the plant, are also efficacious in constantly preparing new supplies of food. The materials of the soil are always undergoing decomposition, whereby the silica, lime, phosphoric acid, potash, &c., of the insoluble fragments of rock, become soluble in water and accessible to the plant. Water charged with carbonic acid and oxygen, is the chief agent in these chemical changes. The more extensive and rapid the circulation of water in the soil, the more matters will be rendered soluble in a given time, and other things being equal, the less will the soil be dependent on manures, to keep up its fertility.

No matter how favorable the structure of the soil may be to the circulation of water in it, no continuous upward movement

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can take place without *evaporation*. The rapidity of evaporation depends upon several causes, which will be individually noticed. One of the most important is:

IV. *The retentive powers of the soil for water.*—The following tables by Schübler illustrate the peculiarities of different soils in this respect. The first column gives the *per cents* of water absorbed by the completely dry soil. In these experiments the soils were thoroughly wet with water, the excess allowed to drip off, and the increase of weight determined. In the second column are given the *per cents* of water that evaporated during the space of one hour, from the saturated soil spread over a given surface.

Quartz sand,	25	88.4
Gypsum,	27	71.7
Lime sand,	29	75.9
Slaty marl,	34	68.0
Clay soil (sixty per cent clay,)	40	52.0
Loam,	51	45.7
Plough land,	52	32.0
Heavy clay, (80 per cent clay,)	61	34.9
Pure gray clay,	70	31.9
Fine carbonate of lime,	85	28.0
Garden mould,	89	24.3
Humus,	181	25.5
Fine carbonate of magnesia,	256	10.8

It is obvious that these two columns express nearly the same thing in different ways. The amount of water retained increases from quartz sand to magnesia. The rapidity of drying in the air diminishes in the same direction.

The want of retentive power for water in the case of coarse sand, is undeniably one of the chief reasons of its unfruitfulness. The best soils possess a medium retentive power. In them, therefore, are best united the conditions for the regular distribution of the soil-water, under all circumstances. In them this process is not hindered too much either by wet or dry weather. The retaining power of humus is seen to be more than double that of clay. This result might appear at first sight to be in contradiction to ordinary observations; for we are accustomed to see water standing on the surface of clay, but not on humus. It must be borne in mind that clay, from its imperviousness, holds water like a vessel,

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the water remaining apparent; but humus retains it invisibly, its action being nearly like that of a sponge.

One chief cause of the value of a layer of humus on the surface of the soil doubtless consists in this great retaining power for water, and the success that has attended the practice of green manuring as a means of renovating almost worthless shifting sands, is in great degree to be attributed to this cause. The advantages of mulching are explained in the same way.

Carbonate of magnesia, it is seen, far surpasses every other material used in Schübler's trials. It retains two and a half times its weight of water, and loses the same very slowly on evaporation. The opinion has been advanced that this excessive attraction for water is one of the causes of the barrenness of certain soils that abound in this ingredient, and may explain why some soils have been permanently injured by heavy applications of a highly magnesian lime.

This is the proper place to notice:—

V. *The shrinking of soils on drying.*—This shrinking is of course offset by an increase of bulk when the soil becomes wet. In variable weather we have therefore constant changes of volume occurring. Soils, rich in humus, experience these changes to the greatest degree. The surface of moors often rise and fall with the wet or dry season, through a space of several inches. In ordinary light soils, containing but little humus, no change of bulk is evident. Otherwise, it is in clay soils that shrinking is most perceptible; since these soils only dry superficially, they do not appear to settle much, but become full of cracks and rifts. Heavy clays may lose one-tenth or more of their volume on drying, and since at the same time they harden about the rootlets which are imbedded in them, it is plain that these indispensable organs of the plant must thereby be ruptured, during the protracted dry weather. Sand, on the other hand, does not change its bulk by wetting or drying, and when present to a considerable extent in the soil its particles being interposed between those of the clay, prevent the adhesion of the latter, so that, although a sandy loam shrinks not inconsiderably on drying, yet the lines of separation are vastly more numerous and less wide than in purer clays. Such a soil does not "cake," but remains friable and powdery.

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Marly soils (containing carbonate of lime) are especially prone to fall to a fine powder during drying, since the carbonate of lime, which like sand, shrinks very little, is itself in a state of extreme division, and therefore more effectually separates the clayey particles. The unequal shrinking of these two intimately mixed ingredients, accomplishes a perfect pulverization of such soils. Prof. Wolff, of the Academy of Agriculture, at Hohenheim, Wirtemberg, states that on the cold heavy soils of Upper Lusatia, in Germany, the application of lime has been attended with excellent results, and he thinks that the larger share of the benefit is to be accounted for, by the improvement in the texture of those soils, which follows liming. The carbonate of lime is considerably soluble in water charged with carbonic acid, as is the water of a soil containing vegetable matter, and this agency of distribution in connection with the mechanical operations of tillage, must in a short time effect an intimate mixture of the lime with the whole soil. A tenacious clay is thus by a heavy liming, made to approach the condition of a friable marl.

VI. *The relations of the soil to heat* are of the utmost importance in affecting its fertility. The distribution of plants in general is determined by differences of mean temperature. In the same climate and locality, however, we find the farmer distinguishing between cold and warm soils.

The temperature of the soil varies to a certain depth with that of the air; yet its changes occur more slowly, are confined to a narrower range of temperature, and diminish downward in rapidity and amount, until at a certain depth a point is reached where the temperature is invariable.

In summer the temperature of the soil is higher in day time than that of the air; at night the temperature of the surface rapidly falls, especially when the sky is clear.

In temperate climates, at a depth of three feet, the temperature remains unchanged from day to night; at a depth of 20 feet the annual temperature varies but a degree or two; at 75 feet below the surface, the thermometer remains perfectly stationary. In the vaults of the Paris Observatory, 80 feet deep, the temperature is 50° Fahr. In tropical regions the point of nearly unvarying temperature is reached at a depth of one foot.

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The mean annual temperature of the soil is the same as, or in higher latitudes, a degree above that of the air. The nature and position of the soil must considerably influence its temperature.

The *sources* of that heat which is found in the soil are two, viz: first, an internal one, the chemical process of oxydation or decay; second, an external one, the rays of the sun.

The heat evolved by the decay of organic matters is not inconsiderable in porous soils containing much vegetable remains; but this decay cannot proceed rapidly until the external temperature has reached a point favorable to vegetation, and therefore this source of heat probably has no appreciable effect one way or the other on the welfare of the plant. The warmth of the soil, so far as it favors vegetable growth, appears then to depend exclusively on the heat of the sun. The circumstances which favor or hinder the transmission or accumulation of the sun's heat, are accordingly worthy of minute consideration.

METHODS BY WHICH HEAT IS COMMUNICATED.

1. *Radiation of heat.*—When we approach a hot body we perceive its high temperature without touching it; heat streams from it in all directions. This heat passes into the air and other surrounding bodies; their temperature rises and that of the heated body falls; there is thus manifested a tendency to equalization of temperature, and such a state is finally reached, after which no more change of temperature is observed except some hotter or colder body be introduced. In the day the sun radiates heat towards the earth, and the latter becomes warmer; at night the earth radiates heat into the planetary spaces, and itself grows colder. All bodies are capable of radiating heat, but they possess this property in very different degrees.

The experimental results on this subject lead to no very definite general conclusions. It seems however, that the porosity, or state of division of the surface of a body, has the principal influence on its radiating power. The less dense the surface, the greater its radiating power. Radiation seems to take place not merely from the surface, but also from a little distance beneath it.

2. *Absorption of heat.*—In our treatises on natural philosophy, there is much apparent confusion on this subject. Absorptive power is often stated to be connected with the *color* of a body.

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It is however the fact that the radiating and absorptive power of a body for heat are absolutely equal. That body which absorbs heat most readily, radiates it also most readily, and *vice versa*. It must be understood however, that bodies may differ in their power of absorbing or radiating *heat of different degrees of intensity*. Lampblack absorbs and radiates heat of all intensities in the same degree. White-lead absorbs heat of low intensity (such as radiates from a vessel filled with boiling water) as fully as lampblack, but of the intense heat of a lamp it absorbs only about one-half as much. Snow seems to resemble white-lead in this respect. If a black cloth or black paper be spread on the surface of snow, upon which the sun is shining, it will melt much faster under the cloth than elsewhere, and this too if the cloth be not in contact with, but suspended above the snow. In our latitude every one has had opportunity to observe that snow thaws most rapidly when covered by or lying on black earth. The reason is that snow absorbs heat of low intensity with greatest facility. The heat of the sun is converted from a high to a low intensity, by being absorbed and then radiated by the black material. But it is not color that determines this difference of absorptive power, for indigo and prussian blue though of nearly the same color, have very different absorptive powers. So far, however, as our observations extend, it appears that dark-colored soils usually absorb heat more rapidly, and that the sun's rays have least effect on light colored soils. This topic will be recurred to.

3. *Reflection.*—Bodies exposed to radiant heat may *reflect* it to a great extent. This is the case with polished metals, while glass is a poor reflector. Reflection is opposed to absorption.

4. *Transmission.*—Radiant heat may also be *transmitted* through bodies precisely in the way that light is. Rock salt transmits 92 per cent. of the heat that falls upon it; alum allows only 12 per cent. to pass, while blue-vitriol intercepts radiant heat totally; it is so to speak, opake to heat. On the other hand black glass, which is opake to light, allows considerable heat to pass through it. This kind of transmission is instantaneous and must be distinguished from

5. *Conduction.*—This is a slower process, and consists in the passage of heat from particle to particle of a solid substance.

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Conduction is destroyed by interruption of contact. Metals conduct heat most rapidly, while earthy matters have but a small conducting power. Liquids and gases conduct heat least of all. Porous bodies, like feathers, wool, cotton, &c., which enclose much air in their interstices, are therefore among the poorest conductors. Soils generally, must therefore rank among poor conductors, although it is probable that there are considerable differences among them. Humus, and soils rich in decaying organic matters, are doubtless slower conductors of heat than dense clays, but to my knowledge we have no precise experiments on this subject. Mr. Hutchinson in an investigation of building materials, found that if we assume the conducting power of slate to be 100, that of soft chalk is 56, of gypsum 20, of sand 19.

6. *Convection.*—Though liquids and gases are almost perfect non-conductors of heat, yet it can diffuse through them rapidly, if advantage be taken of the fact that by heating they expand and therefore become specifically lighter. If heat be applied to the upper surface of liquids or gases they remain for a long time nearly unaffected, if it be applied beneath them, the lower layers of particles become heated and rise, their place is supplied by others, and so currents upward and downward are established, whereby the heat is rapidly and uniformly distributed. This process of convection can rarely have any influence *in* the soil. What we have stated concerning it, shows, however, in what way the atmosphere may constantly act in removing heat from the surface of the soil.

VII. *The relations of water to heat.*—The soil consists not merely of mineral and vegetable matter—not merely of clay, sand and humus—but it is always more or less penetrated with water. The relations of this universally diffused liquid to heat, are therefore of the utmost importance in understanding the conditions of fertility.

Three states of water.—Water may exist in three states—solid, liquid and gaseous. In each of these forms it has a separate significance in connection with our subject, and in its passage from one of these states to another, phenomena are occasioned which have great influence on vegetable production.

It is a matter of common observation that water exposed to the air in a shallow vessel, rapidly decreases in bulk. and finally dis-

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appears; it evaporates, it becomes invisible vapor or steam, and passes into the air. The higher the temperature to which the water is exposed, the more rapidly is this conversion accomplished. On the other hand, when a glass of cold water is brought into a warm, moist atmosphere, or held over the spout of a boiling tea-kettle, a deposition of water takes place on the cold surface; the vapor condenses, liquefies. Thus, by exposing water to great cold it freezes, solidifies, becomes ice; by elevating the temperature of a piece of ice, it becomes first liquid and then gaseous; by cooling vapor, it passes into the liquid and finally into the solid form. Temperature and pressure are the influences that affect the condition of water. The first of these alone needs lengthened consideration here

LIQUEFACTION—VAPORIZATION—LATENT HEAT.

When a piece of ice is placed in a vessel, whose temperature is increasing, by means of a lamp, at the rate of one degree of the thermometer every minute, it will be found that the temperature of the ice rises until it attains 32°. When this point is reached, it begins to melt, but does not suddenly become fluid; the melting goes on very gradually. A thermometer placed in the water, remains constantly at 32°, so long as a fragment of ice is present. The moment the ice disappears, the temperature begins to rise again as before, at the rate of one degree per minute. The time during which the temperature of the ice and water remains at 32°, is 140 minutes. During each of these minutes one degree of heat enters the mixture, but is not indicated by the thermometer—the mercury remains stationary; 140° of heat have thus passed into the ice and become hidden, *latent*, at the same time the solid ice has become liquid water. The difference then between ice and water consists in the heat that is latent in the latter. If we now proceed with the above experiment, allowing the heat to increase with the same rapidity, we find that the temperature of the water rises constantly for 180 minutes. The thermometer then indicates a temperature of 212° (32+180,) and the water boils. Proceeding with the experiment, the water evaporates away, but the thermometer continues stationary so long as any liquid remains. After the lapse of 972 minutes, it is completely evaporated. Water in becoming steam, renders therefore still another portion, 972°, of heat latent. The heat latent in steam is indispensable to the exis-

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tence of the latter. If this heat be removed by bringing the steam into a cold space, water is reproduced. If, by means of pressure or cold, steam be condensed, the heat originally latent in it becomes sensible, *free*, and capable of affecting the thermometer. If, also, water be converted into ice, as much heat is evolved and made sensible as was absorbed and made latent. It is seen thus that the processes of liquefaction and vaporization are *cooling* processes; for the heat rendered latent by them must be derived from surrounding objects, and thus these become cooled. On the contrary, solidification, freezing, and vapor-condensation are *warming* processes, since in them large quantities of heat cease to be latent and are made sensible, thus warming surrounding bodies.

From these facts we are able to understand certain natural phenomena, whose influence on vegetation has been recognized from the earliest times.

How does the earth maintain its temperature—What are its relations to the sun's heat—What is dew?—These are questions we now come to consider.

The earth has within itself a source of heat, which maintains its interior at a high temperature; but which escapes so rapidly from the surface, that the soil would be constantly frozen but for the external supply of heat from the sun.

The direct rays of the sun are the immediate cause of the warmth of the earth's surface. When the sun shines most directly upon the earth, it is warmest, as at summer mid-day. In a winter midnight we have the greatest cold. The temperature of the soil near the surface changes progressively with the season; but at a certain depth the loss from the interior and the gain from the sun compensate each other, and as has been previously mentioned, the temperature remains unchanged throughout the year.

During a summer day the heat of the sun reaches the earth directly, and it is absorbed by the soil and the solid objects on its surface, and also by the air and water. But these different bodies, and also the different kinds of soil, have very different ability to absorb, or become warmed by the sun's heat. It has before been mentioned that air and water are almost incapable of being warmed by heat applied above them. Through the air especially, heat radiates without being scarcely absorbed. The soil and

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solid bodies become warmed according to their individual capacity, and from them the air receives the heat which warms it. From the moist surface of the soil goes on a rapid evaporation, which renders latent a large amount of heat, so that the temperature of the soil is not rapidly but gradually elevated. The ascent of water from the sub-soil to supply the place of that evaporated, goes on as before described. The liquid water of the soil has combined with (rendered latent) a vast amount of heat therefrom, and passed as gaseous water (vapor) into the air. When the sun declines the process diminishes in intensity, and when it sets, the reverse takes place. The heat that had accumulated on the surface of the earth radiates into the cooler atmosphere and planetary spaces, the temperature of the surface rapidly diminishes, and the air itself becomes cooler by convection. As the cooling goes on, the vapor suspended in the atmosphere begins to condense upon cool objects, while its latent heat becoming free hinders the too sudden reduction of temperature. The condensed water collects in drops—it is dew; or in the colder seasons it crystalizes as hoar-frost.

The special nature of the surface of the soil is closely connected with the maintenance of a uniform temperature, with the prevention of too great heat by day and cold by night, and with the watering of vegetation by means of dew. It is, however, in many cases only for a little space after seed time, that the soil is greatly concerned in these processes. So soon as it becomes covered with vegetation, the character of the latter determines to a certain degree the nature of the atmospheric changes. In case of many crops, the soil is but partially covered, and its peculiarities are then of direct influence on the vegetation it bears. Among these qualities the following remain to be noticed.

1. *The color of the soil.*—It is usually stated that black or dark colored soils are sooner warmed by the sun's rays than those of lighter color, and remain constantly of a higher temperature so long as the sun acts on them. An elevation of several degrees in the temperature of a light colored soil, may be caused by strewing its surface with peat, charcoal powder or vegetable mold. To this influence may be partly ascribed the following facts. Lampadius was able to ripen melons even in the coolest summers, in Friberg, Saxony, by strewing a coating of coal dust

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an inch deep over the surface of the soil. In Belgium and on the Rhine, it is found that the grape matures best when the soil is covered with fragments of black clay slate. Girardin found in a series of experiments on the cultivation of potatoes, that the time of their ripening varied eight to fourteen days according to the color of the soil. He found on August 25th, in a very dark humus soil, twenty-six varieties ripe; in sandy soil twenty; in clay nineteen; and in white lime soil, only sixteen. It is not difficult to assign other causes that will account in part for the results here mentioned; there seem to be no accurate and extensive observations on this point. That dark soils may actually attain an increased temperature of three to eight degrees over light colored soils, is a matter of direct observation.

2. *Rapidity with which the soil cools and warms.*—Schübler found that different soils heated to the same point required different times to cool down through a given number of degrees. In the following table are given his results, lime sand being assumed as 100.

Lime sand,	100
Slate marl,	98.1
Quartz sand,	95.6
Potters' clay,	76.9
Gypsum,	73.8
Clay loam,	71.8
Plough clay land,	70.1
Heavy clay,	68.4
Pure gray clay,	66.7
Garden earth,	64.8
Fine carb. lime,	61.3
Humus,	49.0
Magnesia,	38.0

It is seen that the sandy soils cool most slowly, then follow clays and heavy soils, and lastly comes humus. It must be remembered that the experiments were instituted on dry soils, i. e. artificially deprived of water, and hence do not apply to the soil in its natural state, in which water is rarely absent.

As to the rapidity with which various soils become warmed by the heat of the sun or of the day, no observations of any agricultural value have been instituted to my knowledge. It is easy

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to speculate upon this topic. The rapidity of cooling appears to stand in direct connection with the lightness and porosity of the soil; such qualities favor radiation, and the loss of heat by the circulation of the inclosed air. Such soils also, in nature, enclose a considerable amount of water, and in them capillary action is strongest in raising supplies from the sub-soil On account of their porosity, this water is constantly evaporating, and therefore by extracting from them the heat necessary to vaporization, their temperature is speedily reduced. For the same reason moist soils rich in humus, can warm but slowly in the sun's rays. Sandy soils retaining little water, evaporation is less active in reducing their temperature. The surfaces of the grains of sand are glassy and smooth, they therefore radiate poorly, though this depends of course on the *degree* of fineness and smoothness. Clays stand in the middle of the scale.

3. *The degree of moisture present* is of great influence on the temperature of the soil. All soils when thoroughly wet seem to be nearly alike in their power of absorbing and retaining warmth. The vast quantity of heat needful to gratify the demand of the vapor that is constantly forming, explains this. From this cause the difference in temperature between dry and wet soil may often amount to 10° to 18°. According to the observation of Dickinson made at Abbot's Hill, Herts, and continued through eight years 90 per cent. of the water falling between April 1st and October 1st. evaporates from the surface of the soil; only 10 per cent. finding its way into drains laid three and four feet deep. The total quantity of water that fell during this time, amounted to about 2,900,000 lbs. per acre; of this more than 2,600,000 evaporated from the surface. It has been calculated that to evaporate artificially, this enormous mass of water, more than seventy-five tons of coal must be consumed.

Thorough draining, by loosening the soil and causing a rapid removal from below, of the surplus water, has a most decided influence, especially in spring time, in warming the soil, and bringing it into a suitable condition for the support of vegetation.

It is plain then that even if we knew with accuracy what are the physical characters of a surface soil, and if we were able to estimate correctly the influence of these characters on its fertility, still we must investigate those circumstances which affect its

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wetness or dryness, whether they be an impervious sub-soil, or springs coming to the surface, or the amount and frequency of rain-falls, taken with other meteorological causes. We cannot decide that a clay is too wet or a sand too dry, until we know its situation and the climate it is subjected to.

The great deserts of the globe do not owe their barrenness to necessary poverty of soil, but to meteorological influences—to the continued prevalence of parching winds, and the absence of mountains to condense the atmospheric water, and establish a system of rivers and streams. This is not the place to enter into a discussion of the causes that may determine or modify climate, but to illustrate the effect that may be produced by means within human control, it may be stated that previous to the year 1821, the French district Provence was a fertile and well watered region. In 1822, the olive trees which were largely cultivated there were injured by frost, and the inhabitants began to cut them up root and branch. This amounted to clearing off a forest, and in consequence the streams dried up, and the productiveness of the country was seriously diminished.

4. *The angle at which the sun's rays strike a soil* is of great influence on its temperature. The more this approaches a right angle the greater the heating effect. In the latitude of England the sun's heat acts most powerfully on surfaces having a southern exposure, and which are inclined at an angle of 25° and 30°. The best vineyards of the Rhine and Neckar, are also on hill-sides, so situated. In Lapland and Spitzbergen the southern side of hills are often seen covered with vegetation, while lasting or even perpetual snow lies on their northern inclinations.*

* MALAGUTI AND DUROCHER have made some observations on the temperature of soils which have come to my knowledge since the above was written. They found that the temp. of a garden soil, just below the surface, was on the average 6° Fahr. higher than that of the air, but that this higher temperature diminished at a greater depth. A thermometer buried four inches indicated a mean temperature only 3° above that of the atmosphere. Besides the garden earth just mentioned, which had a dark gray color and was a mixture of sand and gravel containing but little clay, with about five per cent. humus, the thermometric characters of the following soils were observed, viz: a grayish-white quartz sand, a grayish-brown granite sand, a fine light-gray clay, (pipe clay) a yellow sandy clay, and finally four lime soils of different physical qualities

The influence of a wall or other reflecting surface upon the warmth of a soil lying to the south of it, was observed in the case of the garden soil. The highest temperature indicated by a thermometer placed in this soil at a distance of 6 inches from the wall, during a series of observations lasting seven days, (April 1852) was 32° Fahr. higher at the surface, and 18° higher at a depth of four inches than in the same soil on the north side of the wall. The average temperature of the former during this time was 8° higher than that of the latter.

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VIII. *Cohesiveness of the soil.*—A soil is said to be heavy or light, not as it weighs more or less, but as it is easy or difficult to work. The *state of dryness* has great influence on this quality. Sand, lime and humus have very little cohesion when dry, but considerable when wet. Soils in which they predominate are usually easy to work. But clay has entirely different characters, and upon them almost exclusively depends the tenacity of a soil. Dry clay, when powdered, has hardly more consistence than sand, but when thoroughly moistened, its particles adhere together to a soft and plastic, but tenacious mass; and in drying away, at a certain point, it becomes very hard, and requires a good deal of force to penetrate it. In this condition it offers great resistance to the intruments used in tillage, and when thrown up by the plough, it forms lumps which require repeated harrowings to

In another trial in March, the difference in average temperature between the southern and northern exposures was nearly double this amount in favor of the former. Among the soils experimented on it was found that when the exposure was alike, the dark-gray granite sand became the warmest, and next to this the grayish-white quartz sand. The latter notwithstanding its lighter color, often acquired a higher temperature when at a depth of four inches than the former, a fact to be ascribed to its better conducting power. The black soils never became so warm as the two just mentioned, demonstrating that color does not influence the absorption of heat so much as other qualities. After the black soils, the others came in the following order: Garden soil, yellow sandy clay, pipe clay, lime soils having crystalline grains, and lastly a pulverulent chalk soil.

To show what different degrees of warmth, soils may acquire under the same circumstances, the following maximum temperatures may be adduced. At noon of a July day, when the temperature of the air was 90°, a thermometer placed at a depth of little more than one inch, gave these results:

In quartz sand,	126°
In crystaline lime soil,	115°
In garden soil,	114°
In yellow sandy clay,	100°
In pipe clay,	94°
In chalk soil,	87°

Here we observe a difference of nearly 40° in the temperature of the coarse quartz and the chalk soil. The experimenters do not mention the influence of water in affecting these results—they do not state the degree of dryness of these soils. It will be seen, however, that the warmest soils are those that retain least water, and doubtless something of the slowness with which the fine soils increase in warmth is connected with the fact that they retain much water, which in evaporating appropriates and renders latent a large quantity of heat.

Malaguti and Durocher also studied the effect of a sod on the temperature of the soil. They observed that it hindered the warming of the soil, and indeed to about the same extent as a layer of earth, of three inches depth. Thus a thermometer four inches deep in greensward, acquires the same temperature as one seven inches deep in the same soil not grassed.

It is to be remembered that the soils that warm most quickly, also cool correspondingly fast, and thus are subjected to the most extensive and rapid changes of temperature. The greensward which warms slowly, retains its warmth most tenaciously, and the sands that become hottest at noon-day, are coldest at midnight.

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break them down. Since the cohesiveness of the soil depends so greatly upon the quantity of water contained in it, it follows that thorough draining, combined with deep tillage, whereby sooner or later the stiffest clays become readily permeable to water, must have the best effects in making such soils easy to work.

The English practice of burning clays speedily accomplishes the same purpose. When clay is burned and then crushed, the particles no longer adhere tenaciously together on moistening, and the mass does not acquire again the unctuous plasticity peculiar to unburned clay.

Mixing sand with clay, or incorporating vegetable matter with it, serves to separate the particles from each other, and thus remedies too great cohesiveness.

When water freezes, its volume increases, as is well known. The alternate freezing and thawing of the water which impregnates the soil during the colder part of the year plays thus an important part in overcoming its cohesion. The effect is mostly apparent in the spring, immediately after "the frost leaves the ground," but is usually not durable, the soil recovering its former consistence by the operations of tillage. Fall-ploughing of stiff soils has been recommended, in order to expose them to the disintegrating effects of frost.

IX. *Absolute weight of soils.*—According to Johnston, a cubic foot of dry silicious or calcareous sand weighs about 110 lbs.

Half sand and half clay,	96	"
Common arable land,	80 to 90	"
Heavy clay,	75	"
Garden mold, rich in vegetable matter,	70	"
Peat soil,	30 to 50	"

This concludes our study of the physical characters of the soil, as they affect its fertility. It is seen that our knowledge is very incomplete, and the whole subject is in the highest degree worthy of an extended investigation. Such a reseach is an enterprise not at all difficult to carry out, by a proper combination of knowledge, skill and pecuniary means. I am more and more convinced that no one thing would so greatly contribute to increase and maintain the productiveness of our fields, as a thorough knowledge and application of the principles that are stated or suggested in the previous pages. We should thereby secure the proper basis

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for the chemical melioration of the soil by means of manures, and as thus one most fruitful source of the failure of fertilizers would be removed, we should have reason to hope that the vexed questions concerning them would be brought to a solution, and out of the present confusion of agricultural opinions and practices, would be evolved a system having in it some signs of harmony and completeness.

That between these different characters of the soil and circumstances in which it may be found an intimate connection exists, is perfectly obvious. In these pages the writer has endeavored to show this connection to a sufficient extent; much more, however, might be written regarding it—much space might also be occupied with the discussion of the characteristics of special soils, but it would be necessary in so doing, in the deficiency of experimental data, to trust more to speculation than is desirable in cases complicated with so many conditions. The subject is therefore commended to the careful study of the farmer, in full confidence that he will here and there be able to derive practical benefit from it. In conclusion it must not be neglected to repeat, that in addition to these physical characters, the *chemical properties* and *relations* of the soil (including the theory of manures), are concerned in determining the fertility of soils, and a comprehensive view of the whole subject is indispensable to the highest success in making a practical application of science.

For the full elucidation of the chemistry of the soil, and for the theory of those mechanical operations, as drainage and tillage, which, serving greatly to improve the physical condition of soils, also materially influence its chemical character, the reader is referred to Johnston's "Lectures on Agricultural Chemistry and Geology," or to Stoeckhardt's "Chemical Field Lectures."

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AN ESSAY

ON THE DISEASES OF THE GRAPE AND THE SUGAR CANE:

BY C. E. GOODRICH.

"Physiology and experience are, I think, fast verging to the conclusion, that atmospheric changes, that is weather or climate, especially as connected with a course of culture too stimulating, are the causes of almost all vegetable maladies; and not less the cause similarly of almost all animal diseases. No plant or animal has a natural immortality. Climate and the stimulation of culture are the falling weight by which both are kept, for a time, in motion, and by which both are, in the end, run down."—Transactions of the Patent Office, 1853, pg. 172.

INTRODUCTION.

The cultivation of the grape and the sugar cane is becoming a matter of national interest. The liability of both to occasional disease, is the greatest discouragement to their culture. The views, taken in this paper, of those diseases will be announced with confidence and boldness, particularly in reference to the grape, as being based on some little observation, both direct and analogical. Let me here say, however, once for all, that I shall hold opinions on this subject open to correction by those whose experience in vegetable pathology is wider than my own. Many of the following views are not in accordance with sentiments widely received on the same topic, so far as I am acquainted with the sentiments of others. They are not however, recent with myself. The spirit of them will be found in my three essays on the diseases of the potato, found respectively in the Transactions of the N. Y. State Agricultural Society for 1847, 1848, and 1851. This last is found also in the Transactions of the Patent office for

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1852, p. 354—372. It is not my design in this paper to write a treatise on the culture of the grape, a thing which has already been well done once and again. Still less is it my design to write a treatise on the culture of the sugar cane, a labor to which my experience is altogether inadequate. My simple object is *to shew by direct and analogical facts and reasoning, the nature, cause and remedy of these diseases.* My habit has been for many years, to journalize the weather with reference to the diseases of vegetation. The older cultivators of the grape and the sugar cane may perhaps detect minor errors of fact and theory in this paper; if so, let them not lose sight of my main design. Let them remember also that I tread new ground, no clear and lengthy exhibition of the cause of these diseases having ever to my knowledge, been written. If these views are found to be true, with reference to the grape and the sugar cane, their wide application to theoretical and practical terra-culture generally will be most obvious*.

I.—PRELIMINARY CONSIDERATIONS.

1. INDISPENSIBLE CONDITIONS OF VEGETABLE GROWTH.—*a. Soil.* —The soil becomes at once the mechanical support and local home of the plant, as well as the source of its twelve, (more or less) inorganic elements essential to the growth of all vegetation. These elements must exist in the soil, not only in fact, but also in an available condition. Practically considered, there must also exist, in every good soil, an amount of vegetable or animal matter sufficient to benefit the soil mechanically, as well as to afford, in part at least, the four organic elements of vegetable growth.

b. Water must co-exist with the foregoing, and in the atmosphere, to become in part, the source of nutrition, to act as the solvent of elementary matters and to become their carrier in the circulation of the plant.

c. Air must co-exist with both of the foregoing, partly as a source of food, and partly, like water, as a solvent and carrier of other things.

d. Light, heat, and possibly other imponderable elements or influences of nature, must be present as stimulants indispensible to all vegetable life and progress.

e. Culture, though not indispensible to all vegetable growth,

* I have treated these two diseases associately because I consider them similar in their causes, manifestations and remedy.

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becomes so practically, in most soils and climates, as a means of enlarging, directing and economizing the use of the preceding elementary bodies and influences. In the most favorable localities of soil and climate, it greatly enhances the results of vegetable growth, while, in unfavorable spots, it is essential to the security of any useful result. In conclusion, the active coexistence of these conditions are essential to all vegetable life, action and result. They make the plant whatever it becomes. With the exception of occasional impediments to health, (which need not be mentioned in this hasty sketch,) *they are the only considerations to be had in mind in the investigation of vegetable disease. Disease, from the very necessity of the case, must be found in some deficiency, intensity, or irregularity, in some one, more or all, of these conditions.*

2. SPECIFIC CLIMATIC REQUIREMENTS.—*Light, Heat and Moisture,* in their relation to *soil* and *air*, exert a combined influence which is denominated, in its temporary aspect, *season*, but in its usually fixed condition, *climate*. Climate and season may be viewed in three aspects.

a. Intensity.—1. Tropical plants, as a whole, require variously, high heat and moderate degrees of moisture. Hence, they are cultivated in what are usually denominated temperate climates, only where those climates exhibit, during the summer, a degree of heat and light closely approximating to that of tropical regions.

The United States of America exhibit, through nearly all their extent, such a character. Hence, in most of the central and northern States, Indian corn, melons, cucumbers, tomatoes, &c., grow with a good degree of freedom, while, in the southern States, sugar-cane, cotton, rice, &c., are cultivated with facility and profit. The United States of America, viewed in comparison with other temperate climates, resemble a gore extended into them from the tropics, during one-third of the year.

2. Hardy plants, on the other hand, indispensibly require, at least for a part of the year, a degree of coolness and moisture inconsistent with the health of tropical vegetation. These elements are afforded to them in the early spring and late autumn, at periods when tropical plants are not in progress. This result is farther reached by uniformly locating tropical plants in the warmest aspects, and hardy ones in those which are cooler. In

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the application of this subject of intensity, it is a matter of familiar experience that a season uniformly dry and hot, like 1854 and 1856, severely affects hardy vegetation, while one uniformly cool, like 1816 and 1848, severely tries the health and quality of all tropicals.

b. Uniformity.—1. Tropical climates present much uniformity, in the continuance of decidedly dry, hot weather as well as in the transition to the wet and cool season.

2. Temperate and cooler climates, especially in the United States of America, on the contrary, are marked by sudden transitions, both in the progress of the season and in the change from summer to autumn. Hence it results:

a. That, in the attempt to cultivate tropicals in a climate usually presenting a hot summer, as in the United States of America, the health of such plants is often severely jeopardized by the occurrence of a single period of cold, wet, dark and windy weather, especially if it be extended over three or four days, as was the case in a remarkable change from the 11th to the 17th of July, 1846. In such cases the evil to a tropical plant results from bringing the whole system of it into an unusual state of moisture, chill, and deficient light, and holding it there in a nearly suspended state of elaboration, until chemical law overpowers vital action in a greater or lesser degree. In such changes, water melons, egg plants, cucumbers, musk melons, tomatoes, summer squash, peppers, beans, pumpkins and Indian corn suffer, and they do so nearly in the order in which they are here arranged, the first suffering most. Potatoes are also injured simultaneously.

b. A similar result is also seen when hot, damp weather (which is an attribute of tropical climates,) invades a climate naturally cool. In this case, hardy plants seem to suffer an engorgement of their vessels and an impeded action of their air tubes, by means of the close state of the atmosphere and the presence of too much moisture. The result in this case, as in the preceding, is the deprivation of the elaborating process, and a partial and sometimes perfect ascendency of chemical over vital forces. The occurrence of such weather early in the summer, frequently injures wheat and other grains, and grass, while later in the summer, it injures apples, plums, cabbage, turnips, walnuts, &c. A single

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invasion of an otherwise equable and happy tempered summer—an invasion not remembered by the careless cultivator—often seems to give character to the whole season, and greatly jeopardizes the hopes of the farmer. A discerning cultivator may always predict, with considerable accuracy, the character and degree of suffering which will result from these two classes of irregular weather.

c. Term of continuance.—Here my present purpose makes it necessary to speak principally of tropical plants, since they especially suffer from short seasons.

In conducting a large market garden for ten years, I noticed that, when tender plants were forwarded in hot beds from as early a period as was consistent with the pecuniary profit of the cultivator, say from the 10th of April, cucumbers could be cut for market by about June 20th; tomatoes and musk-melons about August 10th. To secure this result the summer needed to be somewhat dry and even temperate. If the summer were otherwise these and other tropical crops were proportionably later; and then, in case of an early frost, say by the 10th of September, all tropical productions, with the exceptions perhaps, of corn, beans and potatoes, exhibited a loss of from one-third to one-half of the ordinary profits. The occurrence of a late spring would almost equally injure the same crops, by preventing the timely or safe transfer of such crops from the seed beds, and thus virtually giving a shortness to the season, even with an autumn of ordinary length.

3. Period of maturity.—Closely related to the subject of climatic requirements, and co-ordinate with it, is the consideration of the maturities of plants. The maturity of a plant, in any one year, depends mainly on the elevation of the temperature. A warm summer, other things being equal, matures fruits, grains and roots earlier than a cooler one. Hence, though the sowing and planting season, in the northern States, is considerably later than in England, Holland, and the north of France, their harvest is earlier than in those countries. This result is produced by the higher temperature, and therefore the more impulsive character of the weather. Aside from this general law, maturity depends

1. On a law of reproduction. Plants raised annually from the seed may be made in many, and probably in most cases,

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gradually to increase or diminish the period of their growth as they are carried south or north. This is finely illustrated in the case of Indian corn, which, at the extreme north of its limits of cultivation, ripens in about sixty or seventy days, while, in tropical regions, it requires from two to three times that period. A musk-melon, brought from St. Thomas in 1848, was ripened in 1849 with the utmost difficulty, even with the aid of a hot-bed in the spring.

In 1850 this melon ripened a little earlier. A winter squash, as we should here call it, brought from the same place and at the same time, did not ripen at all, and was irrecoverably lost. There is a limit however, to the improvement of maturities which cannot well be passed. In the very nature of vegetable progress, there must be time for the plant to attain a considerable expansion, to flower and set fruit. This fruit needs to attain to a certain size, and then mature its secretions. To shorten any of these processes must result in a small plant or small fruit, or poorly elaborated fruit, or all these things. These things being so, and our climate what it is, cucumbers cannot be cut for the table short of about nine weeks, nor musk melons or tomatoes of about sixteen or seventeen weeks.

2. With perennial plants, however, the case is different. Their period of growth is fixed at the time of their origin. Thus:

a. An early York peach or red astrachan apple is always early, compared with a Morris white peach or a Newtown pippin apple. Nor does this period of maturity vary relatively or intrinsically beyond the temporary influence of a particular season or soil. In short, a perennial, found to be late or early in a particular climate, remains unchangeably so.

b. In 1848 I imported a potato from Bogota, in New Grenada. It possessed great constitutional powers, and bore seed balls abundantly; but its tubers were late, and no larger than small butternuts. In five or six years I lost it by a gradual decline. In 1851 I imported eight other varieties of potatoes from South America by way of Panama. They were supposed to have come from the coast of Chili. Four of these sorts, bearing considerable resemblance to each other, were, from the beginning, entirely too late, though bearing seed balls early and profusely. They ran out the third year. Of two other sorts, imported at the same time,

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one failed the fourth and the other the fifth year. The last, however, was sent to Virginia early, where, with a longer season of growth, it flourished. A seventh sort ripened from the first in good season, but was dwarf and not valuable. The eighth sort was the Rough Purple Chili, and was found to come within the range of our seasons. It continues to flourish. In December, 1852, I received three more sorts from South America. They were almost undistinguishable in color. One of them, purchased in the market at Calao, in 12° south lat.., (but supposed to have been brought from the mountains,) never half ripened, and was rejected after two years trial. Another was a wild variety, dug by my friend in a wild ravine, within half a mile of Valparaiso, in 32° south lat. This flowered very early, and was covered with flowers all summer, but set neither balls nor tubers, and was irrecoverably lost. A third, bought in the market of Valparaiso, but supposed to have been grown upon the mountains, ripens tolerably well, and shows no decline yet in health or yield. Its tubers, however, are very late, and are often diseased. This sort also was early sent to Virginia, where it flourishes. Thus it is seen that, in twelve cases of imported varieties of the potato, the maturities of each remained unchanged; thus illustrating the law that *character, in regard to season of maturity, is congenital.*

c. As a farther illustration of this law, I may state that, between 1848 and 1857, I originated more than eight thousand varieties of seedling potatoes. They included about fifty-one families and sub-families. There were twelve hundred of them, including fifteen families, originated in 1856, of which I cannot yet speak confidently; but of the others I can truly say that, I have never found a variety vary subsequently from its earliest ascertained period of maturity, although my culture, the second year, often covered one-half of the original number, and one-fourth or fifth the third year. It was from such experience as this, that I was led to lay down the position, in my published rules for the culture of seedling potatoes, (See Patent office report, of 1855, p. 206,) "that *a seedling well cultivated, and yet making small potatoes the first year, will never afterwards mature in season.*"

d. The assertion is sometimes made that, the Isabella and Catawba grapes, though brought from North Lat. 33° to 36°, with

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other varieties brought from southern and eastern climes, have shortened the period of their maturity by long continued and wise culture here. I risk nothing in saying that this assertion is most certainly untrue, and is founded in some mistaken interpretation of facts. I doubt whether, within the widest range of vegetable culture, one well-attested proof can be brought of a perennial shortening the season of its maturity, habitually. An actually new-development of the species, from the soil and air of a given place, is needful hopefully to produce such a change. Indeed, this reproduction must often extend to a second and third time, to receive the needed shortness of season.

e. In order to the perfection of a plant, whether herbaceous or woody, and whether annual or perennial, its annual expansion of limb and fruit should be reached, especially in the case of tropicals, before the occurrence of severe autumnal chills. In that case the branches and leaves will be found filled with matter in such a state of elaboration as is sufficient to mature the fruit. Hence the practice, now nearly universal in the northern states, of cutting up Indian corn soon after the ear is well glazed, and setting it up in shocks. Experience proves that the accumulated secretions of the stalk and leaf are sufficient for the ripening of the ears; while the fodder also is richer than if left in the sun and wind to a later period of time. So similarly, our gardeners often pull up tomatoes by the roots, on the eve of an expected frost, and hang them up in out-houses, or make them into small heaps, where it is found much of the green fruit will mature. On the contrary, if such crops are left out under a light frost the leaves are not only killed, and thus all further active elaboration prevented, but the health of the fruit is more or less jeopardized from the corruption of the half frozen herbage. So further, when a tropical, or even hardy plant, is struck with frost, in a highly immature state, that plant exhibits many young immature cells, of course filled with immature fluids. These vessels can never subsequently ripen, nor will their crude juices ever become available either to the maturity of the plant or its fruit. Nothing but connection with the earth and air, through the medium of the leaf, can ever condense and enrich such juices. Not only will they be unavailing, but they will subsequently become a means of disease to the plant. Such young vessels and juices are

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virtually dead from the moment vegetation ceases. It is just here that the injury of a long and warm autumn, suddenly followed by winter, is felt. The hardiest fruit trees, but especially the half-hardy, as the peach and the grape, are often thus fatally injured. Even corn stalks cut up for fodder, late in autumn, are saved with difficulty, chemical changes in their juices often inducing sourness and decay before they can be cured.

4. TROPICAL PLANTS NOT SUSCEPTIBLE OF ACCLIMATION.—Few topics, relating to agriculture, exhibit so much liability to erroneous opinion as this.

1. It might have been observed that the cucumber, melon, tomato, potato, Indian corn, &c., bear frost now no better than they did when first introduced from the tropics, two or three centuries ago.

2. So it might have been observed that now, just as formerly, the occurrence of a cold and wet, unsteady season, injures or ruins tropical foliage, fruits, seeds and roots.

3. The climatic range of tropicals has not been materially increased. Improvements in protections, aspects, sub-soiling, &c., may now admit of the culture of tropicals in advanced positions northward. But the circumstances remaining unchanged, the limits of the culture of corn, melons, cotton, grasses, cucumbers, &c., remain just at the limits designated centuries ago.

4. The most that can be claimed is, that many tropicals, by reproduction from the seed, may be shortened in season of growth, as already explained above. Other varieties are capable of being budded or grafted on some of the more hardy kindred varieties, as the peach, apricot or the plum, thus shortening the period of their growth. It is also perhaps true, conversely, that some hardy trees, removed south and protected from the hot sun for a year or two, are better able to bear the heat of that climate. It is found here that trees are more safely brought from nurseries, at the east and west, than from New-York city, or New Jersey, in the autumn, the climatic intensity here being greater than in the latter places.

5. Many varieties of plants derive from the soil or atmosphere, where they originate, some peculiar qualities, which cannot be sustained in perfection when transmitted to other soils and atmospheres, though in the same general climatic range. Thus

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the prune plum has never succeeded so well in the United States of America, as in France and Germany.

These preliminary considerations have been treated briefly, and some of them with few illustrations, because they are addressed to those to whom these subjects are familiar.

II.—DISEASES OF THE GRAPE AND THE SUGAR CANE, WITH THE REMEDY.

1. Diseases, &c., of the Grape.—The wine grape of Europe has recently shown liabilities to disease. The same grape, when transported to the United States of America, especially to the northern and north-eastern parts, is even more diseased than in its native climes. Nor are our own native varieties wholly exempt, especially when subjected to the same course of culture. I do not deem it needful to describe the outward manifestations of disease, nor decide what portion of them may be referable to the action of insects. They are usually familiar to the cultivator.

An inquiry into the probable *causes* of the disease of the grape will lead me to contemplate

1. Soil.—*a. Soil chemically considered.*—Of the inorganic elements essential to the constitution of vegetable tissue, especially of the grape, one of the most common and indispensible is potash. The extreme destitution of this, or of any other element in a soil, would undoubtedly result in the diminished health of the grape. I think, however, that the diminished proportion of important elements in a soil results oftener in the dwarfed growth of vegetation than in its diseased condition. However this may be, the fact that often grapes are diseased in soils well constituted by nature or art, leads us to look for the more prominent causes of grape disease in some other connection.

Indeed, without denying that some diseases of vegetation are traceable to the total or partial absence of some important element in the soil, it seems more consonant with a gracious Providence, that the poverty of soils, in the more important elements, should result in a *dwarfed* rather than in a *diseased* growth. Truth, in this line, is taught by experience and not by revelation. In an ignorant state of society men very readily learn the general theory, or, at least, the practice of manuring; but the application of such specific manures as shall bring out the richest results of

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agriculture, can only take place in a highly cultivated state of agricultural science. It was needful for the world, in the infancy of society, that the great staples of human food should be cultivated in the simplest manner. Society then must have well nigh perished had human food depended on the application of special manures. The cultivation of the grape has long been, in oriental climes, a large contribution to human food. Such culture, we must believe, was early practiced without the aid of specific manures. We may now, amid our scientific and practical advancement, discover the value of manures where so applied, especially in incongenial climes and in the culture of deteriorated varieties, whether of grapes or of other plants. But from the beginning I think it could not have been so. Nor will it be said that all oriental grape culture was in highly appropriate soils, such as the volcanic regions are admitted to present. All oriental grape culture was not, and is not, in volcanic regions.

b. Soil mechanically considered.—Experience seems to suggest that the grape needs a soil dry and loose, a heavy clay soil producing a gross and unhealthy growth. That necessity, however, is probably confined to the immediate central position of the grape root, since the analogy of the most healthful native grapes, in natural positions where water is within the distant reach of their roots, seems to indicate that such remote presence of water is not prejudicial to their health. Here however, as in the contemplation of the chemical character of the soil, it should not be forgotten that, in years of prevalent grape disease, such disease pays little regard to the mechanical constitution of the soil. We are led then, as before, to look for the causes of grape disease in some other connection. To all this it may be replied, that the Spitzenburgh apple, which is so delicious when produced in its native valley, fails entirely to produce fine fruit in the neighborhood of Boston; that the Virgalieu pear has long been declining on all the Atlantic sea-board; and that the Port grape produces Port wine only in the neighborhood of Oporto. In these particular cases of failure, and others like them, we may safely admit that the cause may exist partly in the soil and not exclusively in the climate. It should not be forgotten here, however, that the failure in these cases is both permanent and apparently irremediable, while the ordinary disease of the grape seems marked more

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by lines of latitude and climate, than characteristics of soil. Such facts go far to exonerate the soil from at least a leading agency in the production of grape disease.

2. CLIMATE AS AFFECTING THE HEALTH OF THE GRAPE.—The grape, whether we contemplate the varieties imported from Europe, or our own native sorts, has one general constitution, the difference being very much in favor of the hardiness of American varieties. If we compare the climates of Persia, Greece, Judea, Italy, France, Spain, Morocco, (the seats of its ancient and successful culture,) or that of California, whither it was carried from Spain, we shall find climates in strong contrast with our own; climates highly characterized by uniformity of summer temperature, and gradual changes in the succession of the seasons. In investigating the effect of climate on the grape I notice:

a. Cold, wet, fitful weather.—Such weather is ever prejudicial to the vine. In warm, dry tempered seasons, like 1852, but especially in 1854, the grape always exhibits comparatively healthful foliage, and rich fruit. The grape is a half tropical plant, whose climatic sympathies are very much with the melon, tomato, Indian corn, &c., such at least seems to be the character of the wine grape of Europe. (See specific climatic requirements.) The occurrence of cold, wet, windy weather, at any time between the middle of June and the middle of August, is apt to injure its health, since then the tissues of the plant present the largest amount of half-formed cells and immature juices. Such weather seems to produce a torpor of the elaborating process; a state of paralysis which speedily results in a deprivation of the nutrimental juices. Hence originate mildews, rusts, &c., on the leaves, limbs and fruit, which are but the external proofs of the morbid secretions of the plant. These indications are usually preceded by a yellow starved look of the extremities of the vines, and often of the leaves generally. These sudden and extreme alternations of cool and dark weather, with that which was hot, dry and bright, are the marked characteristics of the climate of the United States of America, especially in the northern and northeastern parts. It is worthy of very particular notice that the occurrence of such unsteady weather, in the early spring, before the expansion of the leaves of fruit trees, is always the precursor of the "curled leaf" in the peach tree, a

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disease which, in extreme cases, can always be confidently foretold by the experienced cultivator. See an article on this subject in the Horticulturist of February 1852, p. 63, &c. This disease of the peach tree, both in the character of the weather producing it, and the manifestation of its influence on the leaf and young branches is an important collateral proof of the true nature of the disease of the grape.

b. Hot and damp weather.—This is equally, and perhaps more injurious to the vine than the preceding, when occurring at seasons of rapid growth. In this case the plant seems engorged beyond its power of elaboration, not perhaps absolutely, but because such elaboration is hindered by the amount of dampness involving the leaf and thus interfering with its due æration, and producing a retention, perhaps, both of moisture and carbonic acid, in an undigested state. Thus the same morbid results,—mildew and rust, follow as in the preceding case. The illustrations of the morbid influence of such weather are unfortunately very numerous.

(*a.*) During the last summer, from June 26th to August 3d, the season was very dry and hot. The rains of August 3d, and following, were attended with heat. Incipient mildew was seen on the grape, August 9th, and on the potato, August 14th. But as cooler and dryer weather soon followed, the tendency to disease was checked before serious consequences followed, in either case.

(*b.*) In 1850, the weather from July 14th to August 21st, exhibited an unusual degree of warmth and dampness. I had about two hundred grape vines under culture, on a light dry sandy soil, feltilized with swamp muck, composted with soap boiler's ashes and lime. About one-half of them were trained to the south-east side of a seven feet high fence. The others were set a little in front of it. The sorts consisted of the "Early Black July," "Miller's Burgundy," "Violet Chasselas," and the "Golden Chasselas," ("Royal Muscadine," of Downing,) the "Isabella" and "Catawba," and also two or three varieties of the "Fox Grape." Numbers of the foreign sorts had been grafted on hardy native roots, two or three years before. By the first of August, in the weather just described, the grapes were much mildewed. By the first of September they were nearly ruined in leaf and fruit, and

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much hurt in wood. The native were injured decidedly, but much less than the foreign sorts. I had set five grafts, on the third of April, of a new seedling from a foreign sort. These grafts had made four or five vines, each of from four to six feet in length, some of these being as large at the bottom as one's thumb. One of them had, moreover, shown two clusters of flowers. So severe was the mildew on these, that when trimmed in the fall, they gave doubtful promise of life, and in the next spring were dead, root and branch.

During the same summer my plums, grown in similar soil, were extensively mildewed, dropping many of their leaves in August. The consequence was the loss of nearly all their fruit by rot, or shriveling in an immature state. At the close of the season, winter apples, walnuts, cabbage and turnips were found less sound than usual.

(*c.*) The season of 1851 was very similar in character and results to that of 1850, except that the morbid weather began one month earlier, and produced its effect correspondingly earlier.

(*d.*) Such of these vines as escaped the bad effects of these two years, with no great loss of wood, yielded enormous crops of fruit in 1852, and were very healthy in leaf and fruit. The reason of this marked difference was obvious at the time. The latter year was marked among many for its steady genial weather.

(*e.*) It should be particularly remarked that native varieties, such as the Isabella and Catawba, nay, even the Fox grape, did not wholly escape disease in 1850 and 1851. The amount of mildew on the leaf was trivial, but the berry was often turned brown and unnaturally hardened. Such berries often gained their full size, and did not rot; yet they never softened, nor became eatable.

(*f.*) The wood, in most of these cases of grape disease, appeared more or less discolored in the autumn trimming, showing that its advancement was suddenly checked, in an immature state, at the time the mildew invaded it.

(*g.*) The potato also, during these two years, suffered in a manner exactly parallel with the grape, by mildew on its foliage and seed balls, the latter also becoming brown and hard, as it occurred in the case of the grape. In the autumn the tubers were found diseased.

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If now we review the relation of the grape to these abnormal states of the weather—abnormal at least in comparison with the climate of India and Greece, and Peru, we shall find it suffering almost from year to year in a greater or less degree. These climatic injuries accumulate in the experience of the same individual vine. We shall also find that the early expanding grape is cut off by spring frosts, while frequently the autumnal growth is suddenly checked by the same means. Then follows a long winter, whose cold it seldom meets with the same state of maturity that characterizes the wood of the apple and the plum. Is it strange, then, that the grape declines under such a severity of experience? The peach, though having many points of similarity to the grape, differs from it advantageously to itself in the fact, that its foliage does not fear a moderate frost either in the spring or fall, although the general influence of irregular weather upon it and the grape is similar.

The general healthiness of our native grapes, growing under the same conditions of climate as the foreign varieties, should not be cited in opposition to the preceding argument; for

First—The native grape has a hardier constitution, derived from our own climate.

Secondly.—Nature usually locates it in valleys and beside streams, in positions measurably sheltered.

Thirdly—The native grape is not cultivated, and so is not forced into an early spring development, nor does its growth continue late in the fall. Hence, in both cases it is less exposed to frost while in an actively growing state.

Fourthly—Nature shelters the wild grape from the intense heat of the sun. Its principal vines are usually shaded. Its roots are deeply mulched by grass, weeds and shrubs, and especially by the falling leaves and branches cast off by itself and the forest around it. Thus it is not so intensely stimulated as the cultivated grape standing in cultivated grounds deeply stirred, and kept clean and naked about its roots. The wild grape always suffers when transfered into our gardens, and cultivated as the foreign sorts usually are. Those who have eaten the wild grape on the banks of the Hudson, cannot but have noticed its small wiry branches in contrast with the large, brittle, spongy growth of our cultivated sorts;

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nor will they need any explanation of the superior health of the former.

The injury which the grape suffers from climatic causes, is well illustrated by the action of grape houses. In them we seek to produce both length and uniformity of season, and thus to secure the climate of Greece or California. The first phase of infelicitous weather noticed above, (cold wet changes), is rendered harmless by enclosure under glass. The second phase, (hot damps), is guarded against by wise watering and ventilation, during the continuance of such weather. The consequence is that, in well managed vineries, we secure the health and luxuriance of growth, and deliciousness of fruit, of eastern climes. Then again, by the aid of such protections, not only is the autumnal growth of the wood rendered more perfect, and thus better prepared to meet the severity of winter, but that severity, whether of severe freezing or changefulness, is itself mitigated by shelter. It deserves here to be emphatically noticed that, in a fine equable season, like 1852 or 1854, grapes grown in open culture are equally healthful and delicious with those grown in vineries. In the past history of grape culture, little attention has been given to the influence of climatic causes on its health. In the very few cases recorded in the annual volumes of the Patent Office Reports, I find a growing conviction that the diseases of the grape are somehow connected with the irregularities of the weather. See Report for 1848, pg. 167, Longworth's report; 1849, pg. 287, Neal's report; 1852, pg. 299, Jesse Morgan's report, which has the ring of true philosophy; 1853, pg. 302, Frederick Munch's report. "The Horticulturist," edited by the late A. J. Downing, may be consulted on this point, see vol. 1849, Sept., p 114, Prof. Turner's Memoranda; 1851, March, p. 122, Prof. Turner's article. In the number for June, 1852, in the last leader but one written by Mr. Downing before his death, I find a clear hint of the true philosophy on the subject,—the only one I have noticed in his writings. Had he lived and devoted his attention to the subject, we might have hoped for an able elucidation of it.

3. CULTURE, AS AFFECTING THE HEALTH OF THE GRAPE.—In the loose use of this word, I shall include under it means of propagation, trimming, and culture, properly so called.

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a. Means of Propagation.—This is usually by cuttings, layers and suckers. I do not intend here to open the old controversy relative to the natural duration of perennials, when so propagated. That the rose, grape, raspberry, &c., are readily, nay, naturally thus propagated, I readily admit. Nor do I dispute the wisdom, nay, the necessity of resorting to this method usually, and for the time. That the grape, potato, &c., in a perfect climate, and in a course of culture eminently wise, might practically last forever, may also be admitted; at least the subject, under these qualifications, is not worth disputing about. But practically this admission is of little benefit to the advocates of such perpetuity. All grape growing lands are not situated in a Grecian or Californian climate, nor are all cultivators Downings or Lindleys. As soils are, and as most cultivation is performed, we must ever act on the implication that there is a limit to the healthful duration of all varieties of plants, cultivated as perennials, and that sooner or later we must look to seedlings, spontaneously or artificially originated as a necessary means of the healthful continuance of our useful species of plants.

1. The use of cuttings especially involves a trial of the constitutional powers of the plant, during its period of rooting by exposure to severe climatic influence.

2. The use of grafts, buds, cuttings, sprouts, &c., does not transcend the accumulated depression of previous years, arising from bad culture, uncongenial soil or climate, as a seedling would do. Buds, cuttings, &c., taken from certain trees whose depreciation is in the advance of others in the same neighborhood, and of the same sort, are found to produce weak and sickly trees. If such be the case with them, how soon may the action of the same causes bring other trees of the same sort into the same condition of weakness?

3. The uncongeniality of soils and climates differing from those in which a certain variety was originated, is also thus more severely felt, although in the case of such as exhibit wide adaptation this argument has less force. In contradistinction to all such permanent modes of propagating the grape an occasional resort to seedlings would result in a hardier constitution and a higher adaptation to soil and climate. This hope is based most confidently on general analogy, and on some recent experience

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among cultivators in various parts of our country. What is especially needful is that such experiments be on a proper scale, and in the hands of intelligent men who shall make a wise selection of bases from which to propagate, and of the modes of procedure.

b. Trimming the grape.—1. The wild grape is never trimmed, and does not bear fully until transcending its natural supports, its limbs are permitted to hang down. Thus also most ordinary fruit trees do not bear fully until their branches become slightly procumbent. I do not here argue that we should never trim the grape vine. Few ordinary cultivators have adequate supports for large vines. Indeed, in this climate, nearly all the varieties of grapes yet cultivated, must be treated as exotics, if cultivated in the usual manner. They need to be laid down every winter, at least the risk of injury to the vines, during many winters, is such as to render it wise to do so. Such a course is inconsistent with training them upon trees and hedges or broad artificial supports.

By trimming the grape, in the usual extreme manner, we interfere constantly with its integrity as a perfect plant, destroying the natural balance between the top and roots. Such interference makes its growth, in the early and latter part of the season, unequal, and exposes a comparatively larger portion of tender tissues, in the early part of the summer, to climatic changes than would be the case in a more natural mode of treatment. Hence, too, a comparatively larger amount of its entire tissues is exposed in a tender state, to the severity of the succeeding winter. Experience largely shows that the plant, whether herbaceous or woody, which has comparatively the largest amount of mature, or nearly mature tissues, will survive severe climatic changes with most safety; the older tissues seeming to operate as a basis of health to those which are younger. Hence it is that a grafted grape the first season after it (the graft) is set, suffers more than it does the second summer of its growth. The admitted fact that the most of our grapes, when trimmed on the renewing system, are less liable to mildew than when spur trimmed, is not opposed to these views, since such a mode of training is made necessary from the incongeniality of our climate, acting probably on the deteriorated constitution of the variety so treated. In the more perfect climate of a green house such renewing system of pruning is not needful.

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The practice also of heading back old fruit trees, and thus renewing for a time their energy, is resorted to only because the energy of the tree is diminished. Both these practices are based on the undoubted fact that the vital energy of the roots often outlives that of the top. Hence we often see, in this incongenial climate, declining plum, pear, quince, gooseberry and currant trees and bushes, throwing up thrifty shoots from the root, which gradually, even at times without the cultivator's interference, become the principal tree. Such superior vitality of the root of a tree, in an infelicitous climate, is doubtless referable to the superior security of its position in the soil, free usually from the attack of insects, from accidents, but especially from climatic changes and intensities.

The native grape is often dicœceous and barren. When truly hermaphrodite, aud permitted to embower trees and hedges at will, it often bears fully and annually without being trimmed. Many of these grapes, judging from the diameter of the main vine and the extent of its expansion, acquire a very great age; a proof that, in positions spontaneously chosen, nature provides all needful nutriment. I had a native vine on my hired premises in 1841; it grew on the margin of the garden in a light, deep, sandy soil, which was there never cultivated. The general locality was at the foot of a hill. This vine was expanded over a hedge of hardy cherry and wild plum trees. I know not that it was ever trimmed. It bore a heavy crop, that ripened well, though few of its clusters ever saw the direct rays of the sun. It was encumbered with more or less decaying wood which fell to the ground during the summer, thus shewing the mode in which nature operates. This obviously is thus illustrated. All those portions of the vine, which become too thick for the proper enjoyment of light and air, exhibit a portion of the wood, lying outermost, taking the lead in the early season. Thus the inner and shaded vegetation dies and falls, just as it does in the centre of a large apple or forest tree. In this way, in all these cases alike, the proper balance between the top and the root is preserved. This very grape, when transfered twelve miles, by cuttings, and cultivated in this city, from 1843 to nearly the present time, has been a shy bearer, though planted in a dry light soil much as that in which the parent stood, though not like it a natural soil.

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In this case of garden culture it was trained on a fence seven feet high, and trimmed on the renewing system in hills six feet apart. This unfavorable result was doubtless due to the altered position of soil, and the unnatural mode, (as I now view it) of trimming it.

Numerous notices of the Scuppernong grape at the south shew that, except a little trimming in its early growth, to give it a clean upright stem, it receives no pruning at all, but is permitted to run at will over large trees and frames upheld by pitch pine posts. See Transactions of the Patent office for 1853, page 306, the report of Sidney Weller.

2. But in the case of close planted grapes, in cultivated grounds, an annual pruning is necessary. Here I have found the benefit, after the necessary trimming of autumn, or early spring, of never trimming during the whole summer's growth, nor in the early autumn, except to nip the points of the long branches which otherwise would be killed by the first frost. In this way the whole summer's energy is expended on a much larger amount of wood than is needed for the succeeding year. This wood will also be found of less diameter than in the case of midsummer pruning. But it will be better ripened, being less spongy and so equally, nay, as I suppose much better suited to the purposes of the succeeding year than the larger wood. I think it will appear in the experience of most persons accustomed to the trimming of grapes, that quite frequently, the vines of medium size, or even small diameter, are found best ripened, and stand the winter the best; nor are they less vigorous in the next year's growth. I am aware that, it will be answered to all this, that in this way, a part of the energy of the plant is diverted from the fruit to the branches. But I think not. The entire amount of this wide expanse of foliage goes to sustain the whole plant—root, vine and fruit. Proportionally the fruit will receive more support than upon the system of short trimming at midsummer. It is undoubtedly true that, in refraining from midsummer trimming you will need to plant your grapes wider apart, else a portion, both of the leaves and fruit, will be smothered for the want of air. In the summer of 1852, I had on my grape fence, three fine vines, of the Royal Muscadine grape. In my absence my German laborers had trimmed two of them in the German mode—shortening the wood very much, and removing some of the leaves about

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the fruit. These grapes grew no more, and never ripened naturally, or became of much value. The other vine which was no how superior, I saved from their touch, not trimming it at all. The autumn presented upon it a very large amount of delicious fruit in large clusters. I am happy to find that the ripe experience of Mr. Downing coincided substantially with the preceding views. See the Horticulturist of July 1852, page 271. He there says: "We advise that every leaf be left, and only stop the fruit bearing branches when they become so long as to become unmanageable, or fill the stake or trellis too much. The severe system of pruning out of door vines is both unnatural, and unsuited to our climate."

Since writing the above, I find, on recurring to the Horticulturist, vol. 1, p. 64, the fullest confirmation of these views by Prof. Lindley, and endorsed also by Mr. Downing. They are too long to be quoted here, nor need they be after expressing my own views above; but they are well worthy of careful perusal. The preceding suggestions on trimming the grape are of course applicable only to its open culture. In the grape house every thing is artificial, and there extreme trimming becomes indispensible.

c. Culture, properly so called.—(1.) SOIL AND MANURES.—In a perfect climate, where plants, in the most rapid state of development, never meet with sudden and extreme climatic changes, there is but little danger of over feeding it. But in a climate such as ours, where changes of the weather are constantly occurring, and at very uncertain periods, vegetation, especially that which is tropical, is easily thus injured. The rules of the books then, relative to the formation of grape borders, should be exclusively applied to graperies. For all open culture we need—

(*a.*) A soil possessed of all the elements of fertility, in a moderate state of development.

(*b.*) It should be open and friable that it may not bake and heat, and thus shut off the rain and the atmosphere.

(*c.*) It should be deep that the vine, drawing its nourishment from deep scurces, may thus both start later in the spring, and feel the sudden changes of summer, and the drought less.

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(*d.*) It should be well drained that the roots may not be chilled and surcharged with water.

(*e.*) Manures, in such a climate as ours, and when applied to such a plant as the grape, should be unstimulating, that is comparatively. Hence, if bone dust be applied it should be coarse, and guano should be in small quantities. The composts of swamp muck with manure, ashes, lime, &c., are safer than fresh stable or barn-yard manures. This advice is given to those who seek only so large crops as are consistent with a high regard to the health of the vines. I am well aware how discordant it is with the advice and usage of many who would apply large quantities of fresh stable manure and the offal of slaughter houses to their grapes. They certainly succeed, in evenly tempered seasons, in thus reaping large crops of delicious grapes. Those who are willing to run the risk, and it may be well for those who have ample grounds and wealth to do so, may go beyond this, and stimulate their vines freely, hoping for a season of uniform weather, or trusting to the application of fresh ashes and plaster of paris to check incipient mildew. But even such would do well to cultivate a portion of their vines more moderately, that they may become a dependence in case of severe visitation of disease upon those more highly cultivated, and constitute a more healthful source whence to draw cuttings for future use. I have long been of the opinion that the fertile character of the soils, in the valley of the Mississippi, interacting with the instability of the climate, was the cause of the frequent rot of the grape there, as well as of the difficulties in the culture of cherries, pears and plums. The ravages of insects there, which frequently seem connected with the diseases of these fruits, also become more marked in the same connection. The fertility of the soil probably aids in their production, especially in hot, damp weather. Fruit trees making very rapid growth present a succulence and tenderness of fibre which invite their attacks, especially when their juices are in a morbid condition. The fact that many soils, of not the highest quality, will yet, in good seasons, produce very good grapes, while in seasons of severe changes, the application of ashes and plaster of paris, or a solution of sulphur and lime, is needful to save them from the ravages of mildew, is a proof, not of the essential deficiency of the soil, but of the enfeebled

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and ill-adapted constitution of the grape, which is unable to accomplish due elaborations under such climatic pressure. It is found, in the great western valley that, in seasons of extensive grape disease, crops cultivated on comparatively light and dry soils, escape disease; could a stronger proof of my general position be adduced? Judge Conkling, (see the "Country Gentleman" of Sept. 4, 1856,) finds that on Long Island, a deep, coarse, stony soil is available for the culture of the grape. Such also, it is said, is the character of the soil in North Carolina, in the native positions of the Catawba grape.

(2.) MECHANICAL CULTURE.—Our climate possessing the character of great uncertainty, makes all grape culture difficult, especially that of foreign sorts that are constitutionally adapted to one more uniform and less intense. These two facts, the character of our climate and the constitution of the grape, interact with a soil often too rich, and a course of mechanical culture frequently too stimulating. Hence I would, under ordinary circumstances, of soil, apply to them only moderate culture.

(*a.*) Suppose your grapes in open culture, are well established; I would defer spring culture until the danger of spring frost is nearly past. Experience shews that much development of the buds before the 25th of May is unsafe at Utica, on the line of 43° north. Grapes here have frequently lost their first germinations from frost as late as the 18th, 22d, and 29th of May in the years from 1842 to 1850.

(*b.*) When once culture is begun I wish the early growth to be rapid, while the weather is comparatively cool, as changes in the weather, before the setting of the fruit, are much less harmful than at a later date when the relative proportion of cellular tissue and fluid is much greater.

(*c.*) When mid-summer comes I cease culture entirely. The subsequent growth of grass and weeds, though interfering with that of the grape, is yet preferable to the exposure of the soil to the intense heat of a nearly vertical sun, since they shield the soil from its power, and become a cheap and almost perfect substitute for mulching—an application it is often almost impossible to make on an extensive scale by any means cheaply in the power of the cultivator. Nor less is this mode of culture a means of shielding the soil from cold wind in sudden changes of the

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weather. In this way I may get lighter crops of fruit, but I have an additional security of the health, both of it and of the vine.

(*d.*) For the same reason, also, I permit the small shoots that spring up at mid-summer about the root of the plant to remain, as they, like the weeds and grass, serve to shield the root of the plant from the sun and cold wind. In case the weeds and grass become large I cut off a portion of them, but by no means lay the ground bare, or stir it with any tool. This plan of letting the young shoots remain, I took from a hint given by the late James G. Tracy, of Syracuse, who told me some twelve years since, that he had observed in years of disease, that those vines, whose roots were broadly sheltered by their own foliage, were most likely to escape disease. Many years since I conceived the plan, which others have since carried out and patented, of training my grapes on a trellis, made fast at the foot, and adjustible at the top, so as to be set at any angle of inclination to the horizon. In this way one vine may be made to shade the roots of another, and the angle of its inclination so changed as to increase or lessen the action of the sun on the plant itself.

(*e.*) The health of our vine is often injured in the spring, and both it and the fruit in the fall, by untimely frosts. We often find that the occurrence of frost in the fall, a single week before the grape is perfectly ripe, results in an almost entire loss of the grape for the table; since they do not possess the power of maturing when prematurely picked as many apples, pears, &c., do. The interposition of a screen of movable boards, forming a coping over the trellis or fence on which the grapes are trained, would in almost all cases of such untimely frost, protect the crop. This method is said by Kenrick, (p. 267, edition of 1841,) to be practiced by the French near Fontainbleau, except that this coping is permanent. In the case of an ordinary trellis it would only be necessary to attach permanent horizontal cross pieces to the top of the trellis, at short intervals, these would serve as supports of the coping, made of light wide boards, which could easily be elevated to its place by two persons, just before an anticipated frost.

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RECAPITULATION AND CONCLUSION.

1. THE CAUSES OF DISEASE.—*a.* The simple fact that, in years marked by great uniformity of weather, we are able to raise good grapes, in any ordinary good soil, and by ordinary culture, is a perfect proof that the climate is mainly in fault in the production of the grape disease.

b. The intrinsic evils of the climate act reciprocally with the use of varieties not originally adapted to the climate, and probably now in an exhausted condition, a condition which will ever make them unworthy of reliance for cheap ordinary culture.

c. Even such native sorts as the Isabella and Catawba, originating, as they probably did, as far south as Lat. 33° to 36° can never be perfectly reliable on the line of 42° to 43°, north, i. e., between Boston and Chicago.

d. The natural evils of the climate, and the adventitious one of ill-adapted varieties, have been further enhanced by unwise modes of culture, such as the long continued use of cuttings, close trimming, too rich soil, culture continued too late in the season, and the exposure of the vine in positions of too great solar influence.

2. THE IMMEDIATE REMEDY.—*a.* The use of the strongest varieties, provided they are otherwise valuable.

b. The choice of dry, deep soils of moderate fertility, situated, if possible, in sheltered positions, as in deep valleys, and at the foot of hills, avoiding however hot southern slopes.

c. Moderate culture discontinued after mid-summer.

d. More room than has usually been given, to allow perfect exposure to sun and air.

e. No mid-summer pruning, and allowing such sorts as will stand winter exposure, to run at will over spreading trees, hedges and wide artificial frames.

f. The use of a coping, in the case of close planted and close trimmed sorts, to protect from spring and autumn frosts.

g. The use of fresh wood ashes and plaster of paris in case of actual approaching disease.

3. THE REMOTE REMEDY.—*a.* In such a climate as ours, especially in the northern states, we may not hope ever regularly to

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produce the grape in as high health, and much less, in as great excellence, as in Spain and California.

b. Yet from some results already reached in the culture of seedling grapes, and judging analogically from the improvement of other species of plants, we have a right confidently to hope, that varieties of grapes may yet be attained whose constitutional hardiness, early maturity, and other qualities, whether for the table or for wine, will make them valuable for profitable cultivation in the central and southern states of the Union, as well as capable of moderate culture over most of its northern portions.

c. Such a variety being actually attained, let it be cultivated as far as possible, in accordance with the suggestions under the head of the *immediate remedy* suggested above.

NOTE 1.—GRAPE DISEASE IN EUROPE.

Nothing has been said above of the pervasion of central and southern Europe by this disease. Unfortunately, while we have had descriptions of the visible appearances of the disease on the leaf and fruit, there has been no clear statement of its climatic relations. From the visible marks of the disease, however, joined with the unchangeable laws of vegetable pathology, which are alike in all lands, I have no doubt of the identity of the disease there and here. The climatic obstacles there are less than here, while they act under the disadvantage of cultivating varieties of less vigor than our native sorts.

NOTE 2.—Above I have made no broad discrimination between the liabilities of foreign and native sorts to disease; and for this reason, it seems to me that, though our native sorts are very decidedly stronger than the foreign, the intrinsic difficulties of the subject are with *grape culture as such*, in an incongenial climate, rather than with any variety or class of grapes. The origination of a sort as hardy as the "Isabella," as early as the "Early Black July," will not insure us uniformly successful grape culture on the line of 43° north.

2—DISEASES OF THE SUGAR CANE.

The Natural History of the Sugar Cane.—The sugar cane belongs to the family of grasses, one which includes nearly one-

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sixth of all the species in the vegetable world. Its botanical denomination is Saccharum Officinarum.

Classification.—a. In the *artificial system* of Linnæus it is found in the third class (Triandria,) and second order (Dyginia.) In this class and order it ranks with such useful plants as red-top, reed, timothy grass, broom corn, orchard grass, wheat, rye, barley and oats.

b. In the *natural system* of modern writers it is included under the order Gramineae, or grasses. This, in the system of Lindley, is the twenty-ninth order. It includes, besides the useful plants just named in the artificial system, also the sedges, palms, bamboos and Indian corn of tropical regions.

Remarks.—1. This family is diffused as widely as vegetation itself. Its plants constitute, at the north, our pastures and hay mostly, and include nearly all our grain. At the south they include the tall reed, the strong bamboo and the rich sugar cane.

2. At the north they are hardy, while at the south they are tender.

3. Sugar is a general product of this family. The grasses of our pastures and hay are sweet. Sugar cane, Chinese sugar cane and Indian corn especially abound in sweetness. Reeds of tropical climates are often a rich source of grateful cooling drinks, drawn from them by tapping them below the joints.

A comparative view of the Sugar Cane and Indian Corn.—1. Both grow up jointed, with a leaf at each joint, but dropping the lower leaves in the progress of the summer.

2. Both head out with a flower stalk, when cultivated in natural circumstances. The arrow or head of the Indian corn is jointed through its whole length,—that of the sugar cane is without joints, from the points where it emerges from the main plant.

3. In the same soil and climate both make, it is probable, about the same height, when headed out. This sometimes amounts to twenty feet in the tropics, while further north it is much less; with Indian corn at least, which, on the line of 43°, rarely exceeds eight feet.

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4. The lower joints of Indian corn exhibit what may be called buds, in the shape of a small husk or sheath. These, at about the third and fourth joints, give rise to ears of grain, which number from one to two in ordinary soil and culture, while in more favorable conditions they sometimes amount to three or four. The sugar cane has a true bud, in shape and position much like that of fruit trees. These remain latent the first year, they being nature's mode of preparation for the growth of the cane when planted as a prostrate cutting, in the soil, the second year.

5. The sugar cane being perennial, the roots survive the winter in the soil, and vegetate the second year, yielding what, at the south, is called Ratoon Cane. In the tropics we may suppose they do this spontaneously, but in the southern States it is needful to cover the roots to guard them from frost. This *ratoon* cane is much less vigorous, in the imperfect climate of southern States, than that grown annually from cuttings, which is called *plant* cane.

6. The sugar cane has *perfect* flowers, that is, with the stamens and pistils in the same flower, like broom corn and the most of common flowers. This flower surmounts the plant in a spiked panicle. The Indian corn has a *monœcious* flower, that is, one with its staminate organs on the tassel of the plant, while its pistilate organs or silk are in the husk or embryo ear.

7. The bark or cortex of the sugar cane, and its pith, are much harder than the corresponding portions of the Indian corn, its elaborations being retained in the stalk while those of the Indian corn flow out and form the ear.

8. Both vary in color of bark, from a light green to a dark purple. The color in both is mainly determined by kind, but is modified by culture also, a rich impulsive culture darkening the color of both, irrespective of sort.

The foregoing comparative view is imperfect, but sufficient for my purpose, where disease and climatic relations are the main objects of investigation.

The diseases of the Sugar Cane.—I have not myself witnessed the cultivation of this plant, and my knowledge of the facts in the case are mainly drawn from the Transactions of the Patent

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Office for 1848, pp. 274-338; 1849, pp 423-424; 1855, pp. 268-277. But the universally conceded analogy of the plant, and its culture, to Indian corn, and the uniformity of the general laws of vegetable pathology, combined with the clear statements of the circumstances of disease, make it quite safe to draw conclusions in regard to the causes of the disease.

I find no very minute statement of diseased manifestations, and of the soil, culture or weather in connection with which these manifestations have been observed. The few statements which I do find, are all so analogous to numerous very common facts in vegetable diseases, that I was led at once, when first they came to my knowledge, some five or six years since, to feel that the causes of the disease were obvious.

In the investigation of this subject I shall follow nearly the same course of inquiry as the one just passed through with respect to the grape.

CAUSES OF DISEASE.

1. Soil.—*a. As chemically considered.*—Concurrent testimony shows that the analogies of this plant are very close with Indian corn, in structure, both internal and external, deposition of saccharine matter, and climatic requirements. The main difference is, that it requires a higher temperature and a longer season for maturity than the latter. From the Transactions of the New-York State Agricultural Society, of 1848, I take the following tables relative to the mineral elements of Indian corn, page 819. The fodder and the grain, after the former is dry enough to stack and the latter to crib, contain not far from 15 per cent. of water and 85 per cent. of dry matter. After subtracting the water, every 100 lbs. of the dry matter contain about from 4½ to 5½ lbs. of ash, and each ton contains from 90 to 110 lbs. of inorganic matter. The following table represents approximately the proportion of the several bodies in 100 lbs. of ash which is about the ordinary amount removed by a ton.

Silicic acid,.....	41.269
Phosphoric acid,.....	7.903
Phosphate of iron, lime and magnesia,.....	9.256
Potash,.....	12.709

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Soda,	12.379
Lime,	3.075
Magnesia,	3.597
Chlorine,	3.855
Sulphuric acid,	5.959
	100.000

The same experimenter found, in the analysis of numerous varieties of corn, p. 820, that in a plat giving 105.68 lbs. of ash, the result was distributed among the several parts of the plant as follows:

Grain,	8.15
Cob,	2.54
Husks,	9.86
Leaves and sheaths,	45.60
Stalks and tassels,	39.53
	105.68

Calling an acre of corn about six tons, there will be removed by every such crop about 600 lbs. of inorganic matter. In a comparison of the exhausting influence of a crop of sugar cane and Indian corn respectively, a deduction should be made in favor of the sugar cane of all that proportion of the ash which enters into the grain and cob of the Indian corn, since the sugar cane in Louisiana bears no seed. If the remaining stalk and leaves of the corn give an ash corresponding very nearly with that of the sugar cane, the result would be that the latter would be considerably less exhausting to the soil than the former; and such, I understand, is considered to be the fact by the cultivators of the cane. When it is considered, moreover, that phosphoric acid, magnesia, potash and soda enter very largely into the ash of the grain of Indian corn, the difference is still more in favor of the sugar cane. Silicic and phosphoric acid are probably about equally found in each, and in both more largely than in common vegetables and hardwood trees. The soil of Louisiana being principally the result of deposit from the Mississippi, may be supposed to abound largely in all the inorganic elements

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needful for the growth of the sugar cane. Silex, being more readily deposited from water than other matters, would be found most abundant nearest the banks of the river. Those plantations that are farthest from the river might probably fail soonest from a deficiency of silex in the soil, as some writers have suggested. (See Patent Office reports, 1848, p. 286, &c., and 1855, p. 275, &c.) But a more important consideration remains to be stated. Sugar is constituted entirely of inorganic matter, and is represented by carbon and water. Hence, in every well conducted system of cane culture, the return of the refuse matter of the cane to the field will preclude any waste of the most important elements of the soil; I mean those which are mineral. Whatever may be the fact in regard to the exhaustion of the silex of the soils in Louisiana, whether by culture or otherwise, I should not look to that cause primarily for the origin of disease in the cane. A diminished supply of silex, or any other element, organic or inorganic, in a soil where Indian corn is cultivated, results not so much in the diseased as in the dwarfed condition of the crop; and the same is true of other gramineous crops, as the grains and grasses. In the Northern States we find, if I mistake not, that Indian corn and the cereals generally, when raised on soils that have been impoverished by long culture, but that are not otherwise inappropriate, are diminished in quantity rather than in health. Indeed, if sugar cane were liable to disease from this source, we should look to see Indian corn diseased also in the same circumstances, since its demand on the soil for mineral elements is even greater probably than the sugar cane, by all that portion that goes to form the cob and the kernel of the corn. The superior ripeness of the corn would also be a reason of its greater exhaustion of the soil, it being well known that the removal of an immature crop from the soil results in less exhaustion than a mature one. I would not deny that deficient elements in the soil may sometimes be the occasion of disease in vegetation, yet, for the reasons already stated, and others yet to be mentioned, I think it not the principal cause of disease in the sugar cane.

b. Soil as mechanically constituted.—We are told, (Transactions of the Patent office, 1848, p. 286, &c.,) that in Louisiana the

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sand diminishes in the soil as you recede from the river, the change being gradually made to a clay mixed with vegetable deposit; and that this soil when properly drained, is very rich and well adapted to the growth of cane and most other crops. We may hence infer, that almost any interval land, holding a due medium between dry, coarse sand and gravel on the one hand and wet clay on the other will, in an appropriate climate, produce good sugar cane. These limitations are much like those of Indian corn, except that the latter will grow well in the coarsest and dryest land provided it find there the needed mineral elements, it being in this respect, one of the coarsest feeders we cultivate. In this it has much the advantage of the sugar cane, the canes of which when planted in the furrow need fine earth, well elaborated over their whole length, to encourage germination, while a very small portion of fine soil, immediately around the kernel of the Indian corn is sufficient. The great evil I apprehend, in the condition of the soil in the culture of cane is dampness; the extreme of moisture, in a cool season, chilling the whole plant, and in a hot one provoking too rapid a growth, and thus making the plant too vascular, and leaving it at the close of the season, immature. The general fact however that, in some seasons the disease of the sugar cane is found on most soils, however chemically and mechanically constituted, and that, in other seasons, nearly all soils are exempt, seems to me, to exonerate the soil from at least a leading agency in its production, and to lead us forward to the investigation of some of the other conditions of vegetable growth in which mainly to find it.

2. CLIMATE, AS AFFECTING THE HEALTH OF THE SUGAR CANE.—By a recurrence to the general principles, (heretofore stated in specific requirements of plants) the specific climatic requirements of tropical plants will be seen. The climate of Louisiana, though doubtless exhibiting a degree of heat adequate to the moderate prosperity of the sugar cane, fails in some important qualities. The sugar cane is a thoroughly tropical plant, produced on islands and maritime coasts, where it finds a climate very different from that of Louisiana.

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a. The climate of Louisiana, and the adjoining sugar growing States, is *too cool* for the highest perfection of its culture. Hence,

(1.) The cane, at least those varieties now cultivated does not fully develop itself; and as a consequence its elaboration of saccharine matter is not perfect, the sugar often crystalizing with difficulty. The cane now cultivated in Louisiana was imported, (see Transactions of the Patent Office, 1848, p. 281, and 1855, p. 273, &c.,) from the island of Java, Bourbon, Mauritius and Tahiti, and the districts of Malabar and Bengal in India. It is obvious how different are all these climates from that of Louisiana. Java lies between 6° and 9° south lat.; Bourbon and Mauritius between 20° and 21° south lat., and Tahiti 18° south lat. The coast of Malabar and Bengal, in India, lies between 10° and 27° north lat., but from what points within these limits the sugar cane was brought does not appear. The fixed character of plants (p.18, plants not susceptible of acclimation) forbids the idea that one cultivated as a perennial, as is the cane, and brought from climates such as are presented by these islands and maritime coasts, should ever conform itself to such a climate as that of Louisiana, situated for the most part between 29° and 33° north lat. Cane, in its native region, is said to be filled with crystalizable matter to the very extremity of the plant. That of Louisiana is confessedly much less rich, the upper part of the plant being unfit to grind for sugar.

(2.) The sugar cane, in its native region, bears seed. I am aware that this point is practically disputed. (See Patent Office Report of 1848, p. 284.) What may be the effect of culture on the seed-producing powers of the cane, I will not now stop to ask, further than to hint that, as in the case of the Peony, pink, some varieties of the balsamine, snow-ball, flowering almond, &c., where the power of culture so distorts the flower, and the habits of the plant, that it never or rarely produces seed, so it may be with the sugar cane in its circumstances of culture. It were an anomaly, however, in the constitution of material things, to assert that the sugar cane, at least in its truly native condition of growth, does not bear seed—such seed

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as is capable of germination. There are many tropical plants, which are perennial or not, according to the climate where they are cultivated, and which may be propagated with facility by seed, cuttings, tubers, &c. Thus, the Lima bean is a seedling annually here, but is perennial in Liberia. The scarlet running bean is usually cultivated as a seedling, yet, even here, its roots are capable of surviving the winter and growing the second year. Dahlias are raised readily from seed, cuttings, or tubers. Peppers are biennial, and perhaps more at Bogota. Nasturtions are perennial in Peru. So are squashes in the Sandwich Islands. The potato is readily grown from seed to its full size the first year, or it may be readily propagated by cuttings, though usually reproduced by tubers. In the cane-growing States the cane not only does not bear seed, but does not even head or "tassel out," as we say of corn. It is cut for grinding for sugar at that stage of its growth at which Indian corn is often cut for summer fodder, when pastures are short, i. e., just before it throws out its top, which is when it is about half grown. Who would call corn ripe at that stage, however vigorously it had grown?

According to statements, (see Patent Office report, 1848, p. 283,) cane that is six or eight feet high throws out a top or arrow of from five to seven feet more in height. This corresponds very nearly to the habits of Indian corn. At the north the yellow corn, in good soils and seasons, seldom exceeds eight feet in height, and is often below it. Of this the part above the ear is considerably more than half. On the contrary, the southern gourd seed corn I found, in central Ohio, in 1842, standing thirteen feet high, but was told that it attained, in good years, sixteen feet in the same soil. In this case the ear is above the middle of the stalk, thus making the top less than one-half its whole length.

I am aware that it is asserted that the cane arrows or tops sparingly even in the West Indies. (See Patent Office report, 1848, p. 283.) But this may be owing to some want of wise culture, rather than to a natural habit of the plant. Sugar cane, in Liberia, attains a height of fifteen feet, with a diameter

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of two or three inches. Its growth there is larger than in Barbadoes. (See Dr. J. W. Lugenbeel's "Sketch of Liberia," p. 24.) The Doctor does not state whether it tops out or not, but at the height of fifteen feet we hardly need ask the question. Neither does he state whether it bears seed.

Indian corn, when planted at midsummer, often matures its ears sufficiently for boiling before frost; but in the event of a cold autumn, as in the case of 1856, it does not even head out. Suckers about the base of the plant, even in good seasons, do not head out, though often bearing an imperfect ear at the top of the plant where the tassel might have been expected. In very prosperous years of corn culture we often find a small irregular ear of well ripened grain on the very apex of the tassel, although the Indian corn is a dicœcious plant, having its staminate organs at the top.

These, and such like facts, in the culture of corn, go strongly to suggest, analogically at least, that in its appropriate climate, and by proper culture, the sugar cane ought to bear seed freely.

The failure of tropical plants to mature so as to exhibit seed, or other appropriate secretions, in a northern climate, is a matter of common experience. In 1851, I planted a convolvulus, imported from Madeira. It was forwarded in a hot bed, and grew with great vigor and health, but never developed a single flower. Humboldt hints somewhere, I think, that wheat, on the Mexican Andes, refuses to head. So the potato, imported from Valparaiso, never formed a tuber. Indeed, it is a frequent fact in agriculture, that many plants, even in their appropriate climates, fail to ripen seed or fruit, when excessively or otherwise unwisely cultivated. I cannot therefore consider the constant failure of the sugar cane to top out and bear seed, in the southern States, in any other light than that of a proof of its permanent immaturity in the region where it is thus cultivated. That it now begins to fail, after so long a period of tolerably successful culture, is a proof then, not of its essential feebleness as a species of plant, but rather of naturally great vigor of constitution.

(3.) The disease of the sugar cane is attended with just those marks that indicate that the climate is especially at fault.

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First—the cane, in such cases, is enlarged and discolored, and its juices corrupted. No one, who has cultivated melons, cucumbers, tomatoes, summer squashes, and even occasionally sweet corn, on a large scale for market, during years of severe climatic mid-summer changes, as in 1846, or in permanently cold summers, as in 1848, will be a stranger to closely corresponding indications of morbid condition. Cold wet autumns also produce similar results on sweet corn that had been intended for late market.

In these cases, melons of all sorts were decayed on the lower side, or exhibited dark hearts. Cucumbers and summer squashes had carious spots on the outside. Tomatoes were covered with brown and black indurations. Sweet corn, in the latter part of the summer, grew and rotted in the husk, even when planted widely apart, with access of air and light.

Secondly—The sugar cane exhibited mildew about the joints. This is often seen on Indian corn when having been cut up, the autumn is unfavorable for curing it.

Thirdly—A gummy or waxy exudation is seen about the joints of the sugar cane. When this is considerable in quantity, the produce of sugar is small. So similarly, in morbid years, cucumbers and summer squashes, at mid-summer, and winter squashes when gathered in the autumn, often exhibit gummy concretions over their surfaces. Water melon and musk melon vines, when injured in early or mid-summer by a severe chill, show a black gummy matter standing in drops a few inches from the extremities of such vines as had grown most thriftily. In all these cases such excretions were very offensive to the smell. They all, as also those of the cane, are instances of juices diverted from the proper circulation while the plant is in a morbid state, like a vegetable erysipelas. In the case of the sugar cane the rationale of its appearance perhaps is this. Both the sugar cane and Indian corn are constituted with a determination of juices to the bud, in the one case to expand the bud the second year, and in the other to form the ear of the present year. The sugar cane perhaps needs a portion of this gum to protect the joint and the bud from the severities of the coming winter, but

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in the case of a morbid season the deposition on the surface is unduly large, thus robbing the plant of a portion of that matter which should have been deposited in the form of sugar in the vessels of the plant. Its appearance on the surface is a proof of morbid action showing a want of vitality in the plant.

Fourthly—The season of grinding the sugar cane often comes at a period when the secretions of the plant are too immature or diseased to granulate, and are fit only for molasses. This fact is parallel with the occasional condition of some fruits, when, in consequence of cold, wet summers, the fruit in autumn exhibits not secretions of sugar, but of starch and acids. (See Silliman's Chemistry, edition of 1850, section No. 783.)

Fifthly—What strengthens these impressions of the inappropriateness of the climate of Louisiana for the most successful culture of the sugar cane, is the fact that its sugars are found much less fitted for the purpose of the refiner than the sugars made in the tropical regions. The sugar in the former case appears as though made of juices imperfectly matured at the very point of fermentation.

The explanation of this is most obvious. Sugar cane, besides the elements of sugar, which are themselves fermentable when in an imperfect state of elaboration, contains a considerable quantity of gluten. (See Johnstone's chemistry of common life, vol. 1st, p. 206, edition of New-York, 1855.) In the imperfect health of the plant these glutinous substances run quickly into a state of putrefactive fermentation. Even when the cane is healthful they jeopardize the safety of the expressed juice, unless speedily boiled. So similarly, in the spring of the year the last drawn sap of the sugar maple is incapable of granulation into sugar, and is fit only for molasses.

Sixthly—I have often noticed that imported tropical plants grow with marked vigor the first year, and then gradually decline, if the period of their maturity is inconsistent with the length of our seasons. In such cases the plant runs through the period of its declension in from two to five years. See the illustration in the case of the potato previously recorded.

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The success with which Indian corn, a plant closely related to the sugar cane, is cultivated, should not be cited against the position that the sugar growing region of the United States of America is too cold for its most profitable culture: for, *first*, Indian corn is adapted to a less degree of heat than the sugar cane. *Secondly*, even it is injured temporarily by a cold season. *Thirdly*, it is always cultivated as a seedling, and so gradually accommodates itself to the length of the season where it is permanently cultivated. Thus grown, moreover, it retrieves the injuries of one year by the healthier growth of the next, while in the cases of such perennials as the sugar cane, grape and potato, the injury accumulates from year to year.

There is no more reason why a perennial plant, suffering climatic injuries from year to year, should recover from them perfectly, than that animals should perfectly surmount the effects of repeated attacks of disease, or the effects of constant climatic pressure. The assertion of the contrary doctrine would be that of a virtual immortality, (accidents apart) of both plants and animals. Indeed, how often do we see a plant sink, in one season, under repeated attacks of hard chills, heavy rains, and light frosts?

a. The climate of the sugar growing States is too irregular for the best health of the sugar cane.

1. Such fitfulness is the striking characteristic of the climate of a large portion of the United States of America. The rationale of its influence on tender plants, was previously described, in treating of the grape. There is this difference, however, between the grape and the sugar cane. The former suffers almost equally from hot damps and cold chills, while the latter, in common with most tropicals, suffers almost exclusively from the latter. See the illustration of inconstant weather on the cucumber, melon, squash, egg plant, potato, pumpkin, pepper, beans, corn, tomatoes, &c., in the Transactions of the New-York State Agricultural Society, for 1847, p. 442-444; and 1848, p. 412-414.

2. The theory of acclimation, often introduced at this point of the discussion, is one of the imagination only, and is never veri-

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fied by facts. Perennial tropical plants, cultivated in an incongenial climate, (one rendered so by shortness of season, and irregularity of impulse,) never gain a substantial adaptation to that climate. See above preliminary consideration 4th.

c. The influence of damp hot weather on the sugar cane.—From the analogy of Indian corn, and other tropicals, I do not suppose that the sugar cane suffers greatly from this phase of weather, it being truly tropical in its character, and so consistent with the health of tropical plants, unless attended with a suffusion of water about the roots. Indian corn, when once started in the spring, grows with less moisture than any other tropical cultivated at the north. At the same time it bears, without marked injury, a large amount of moisture at mid-summer and early autumn, provided the sub-soil be dry and the weather warm. It is cold damp weather that injures corn. Such analogically would be the case with sugar cane, and such I infer is the fact. See Transactions of the Patent Office, 1853, p. 356; article, Climatology. The principal injury to the sugar cane, from warm damp weather, would be in autumn, when it would lead to excessive development, and interfere with those elaborations which bring the juices of the plant into a crystalizable state, that is, ripen it. And such is its injury to corn.

In both, the ordinary decline of heat, experienced at the commencement of autumn, is needful to terminate the expansion of the plant, and dispose it to mature, especially in the case of the cane, which is already too late for the climate.

d. The influence of dry hot weather.—This phase of weather not being peculiar to the region of the sugar cane, in the United States of America, should not be dwelt upon emphatically here, although its effect may be properly noticed. Such weather, by withholding the amount of moisture needful to distend the plant, and aid its elaborations and depositions, while it is highly stimulated by heat, will prevent its growth, since the appropriate absorptions from the earth and air are thus impeded. In extreme cases the whole plant is dwarfed, and its elaborations are small in quantity and poor in quality. Such was the result of the extreme drought in 1854, in the culture of tomatoes and melons, and probably other tropical plants not particularly noticed. Those tomatoes and melons were scarcely eatable in quality.

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With Indian corn, however, the case was different. Here the ears, though but half their usual size, in cob and kernel, were sound. They matured very early. Analogically, I infer, that dry hot weather would affect sugar cane similarly, that is, reduce the size of the plant and the quantity of sugar, without deteriorating its quality. In the early spring, such weather might prevent the free germination of the cane. Such weather, carried to a moderate extent, is useful in bringing the elaborations of most tropicals to a high state of perfection.

e. The season of the sugar-growing States is too short for its perfect maturity.

What the ascertained period of the growth of the sugar cane is, I do not know, or rather I believe it is not fixed, but varies with general temperature, quantity of rain, and sudden transition from summer to autumn. Vegetable growth being in the combined proportion of length of summer and climatic impulse, will obviously be greatest when the season is at once long and hot. Definite periods in the growth of cane, as in that of Indian corn, will depend on the abruptness of the transition from summer to autumn, since without such transition, cane, as well as many other plants, would grow almost indefinitely. Facts prove, however, in our own cane-growing districts, and with the varieties there cultivated, that the season is not long enough to give due development to the plant and at the same time to mature its juices, since autumn frequently finds the whole plant imperfect. The result of such imperfection, in regard to its availability in the production of sugar, will be seen by referring to pp. ——

Recollecting now the successive steps of this argument—coolness, instability, hot intensity, and shortness of season—it is painfully apparent that *climate*, *season* or *weather*, has much to do with the disease of the sugar cane.

The Rev. J. B. Pinney, formerly the governor of the colony of Liberia, in Africa, lately told me that in Liberia, the Ratoon cane is cut in high perfection year after year, without the necessity of replanting. He also informed me, on the authority of an intelligent merchant of New-York city, that there are plantations in Cuba on which Ratoon cane has been cut profitably for eighteen successive years, without replanting. Need we any stronger evi-

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dence of the essential imperfection of the climate of the Southern United States, at least in reference to all the varieties of cane hitherto cultivated there?

3. CULTURE AS AFFECTING THE HEALTH OF THE SUGAR CANE.—*a. Mode of propagation.*—My remarks on the question of propagation by cuttings, in the case of the grape, may here be referred to, to save repetition. (See p. —.) This mode of propagating the sugar cane is not only the most ready, but also indispensible in all common cases where an immediate crop is sought; but,

1. To say nothing of the mode, when long pursued, as intrinsically tending to produce deterioration, is it not obvious that this result would probably be produced when we consider that all the varieties of cane actually in use in the cane growing States, are a little too late for the climate, and that they are often rendered still more immature by the infelicity of the season? These causes may well be supposed to accumulate from year to year.

2. This evil is enhanced by the unwise practice, which has extensively prevailed, of using the tops of the canes for planting. These, as being last formed, are the least matured, and so have the least vitality to carry them through the winter, and the least amount of organizable matter to impel the germ in the succeeding spring. This practice is not universal, but may have been resorted to often enough to injure the whole stock now in use. When such top canes are not used for seed, those from the old root, called Ratoon cane, are employed. (See Patent Office report of 1848, p. 285.) Such canes, just like the grafts of an old tree, have less vitality than those taken from the plant cane of the last year's culture; for, although the whole race is in a state of decline, the last and most vigorously grown plants will make the best cuttings. The failure of this ratoon cane, grown from roots but a year old, is a sad proof of the state of exhaustion of the whole race, and may be contrasted with the condition of many foreign grapes which are kept in tolerable health by being frequently reproduced by layers or cuttings from the old root.

3. So also the influence of a Louisiana winter should be taken into the account. In the northern States, the cuttings of the grape, gooseberry and quince, and the grafts of other fruit trees, are most carefully chosen from well ripened wood. They are often not cut until the very close of winter. Previously to being

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cut, they are all, with the exception of the grape, capable of bearing the most intense cold of our winters without injury. When cut, whether earlier or later, they are either buried out of doors, where they are kept in a frozen state, often almost up to the week in which they are set, or they are stored in damp earth or saw dust in our cellars, where the temperature is steadily but a little elevated above freezing.

The sugar cane cutting, whether planted in the autumn, or otherwise preserved from frost, for spring planting, can not be kept in the same state of quiescence. It has also the disadvantage of having a more vascular structure, and more fermentable juices than the cuttings of hard woods. For both these reasons it is liable to injury from the changeful temperature of a southern winter. Any unnatural heat, in the middle of the winter, would predispose it to germinate, as here in the case of potatoes stored a little too warmly. Such predisposition being checked would tend to a state of fermentation and decay in the juices. That danger is actually incurred in this way, is evident, from the fact that the cane frequently rots in the ground in wet winters, and in soils not well drained. (Patent Office report, 1848, p. 284.)

In climes congenial to the culture of sugar cane, the season of winter rest is so short that the cane cuttings being planted in good order, their juices immediately commence those changes needful for the germination of them. Thus the germs of the cuttings are pushed into the atmosphere just as soon as it is warm enough to receive and foster them. In Louisiana there are long weeks of weather so cold and damp as to exercise no favorable influence preparatory to its germination in the spring. In short, the influence of using imperfectly ripe cane for seed, and its exposure to irregular winters, must accumulate from year to year. In the end, these evils must work the same injury, in the culture of cane, that the habitual use, in other places, of the seeds of immature tomatoes, cucumbers, or melons, would do. Eventual depreciation of constitutional vigor must necessarily result to every organized being, whether animal or vegetable, from such frequent and severe trials of health.

Can it be for a moment doubted that injury has actually thus resulted in the culture of cane? Many careless cultivators of

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such tropicals as cucumbers, melons, tomatoes, &c., often find these plants depreciating in their hands, and they need to renew their seed from the gardens of more careful cultivators.

In a careful selection of dry warm soils for tropicals, with the use of hot beds in forwarding the more tender of them, and the careful selection of well ripened and perfect fruits for seed, I have found their vigor not only sustained, but often improved. The occasional infelicitous influence of an unfavorable cold season, like 1848, or a very dry one like 1854, is usually retrieved in the succeeding year. On the other hand in the cultivation of a plant like the sugar cane, in a climate a little too cool and irregular, and a season too short, and by unwise choice of seed cuttings, it seems impossible to save the plant from eventual and rapid depreciation.

Amid the imperfections of soil, season and culture, even our hardiest perennial fruits and vegetables eventually depreciate, and need renewal from the seed, whatever may be said of the durability of such perennials under supposed modes of culture.

b. Manuring.—Whatever gives rapid development to vegetation, results in the disproportionate production of cellular tissue over woody fiber, and thus exhibits a watery and tender state of the plant. This difference is made strikingly apparent wherever the gardener, in the spring, forwards some cabbage plants in a hot bed and others in open culture. On transplanting both, on the same day and into the same soil, it will be found that the plants raised in open culture, though smaller in size, will have a decided advantage should the subsequent weather happen to be cold and changeful. Even hardy plants, as wheat, barley and oats, in cold and irregular, but much more in hot, damp weather, are more liable to rusts and mildews, when overgrown in highly manured soils, than when grown in a soil of medium fertility.

Again, the influence of a highly manured soil drives the expansion of the plant too far, and does not always permit the formation of flowers and the setting of fruit sufficiently early. In 1834 I set a row of tomatoes in my garden, beginning at the rich, moist termination of a sink-drain, and retiring from it in a direction up hill into drier and poorer soil. My fruit began to ripen on the top of the hill, and gradually descended towards the sink-drain, the last three or four hills not maturing a single fruit. Every

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observant cultivator will call to mind similar facts. In the application of these principles to the cultivation of sugar cane, it may be observed that, had it always been cultivated in a soil of but moderate fertility, the crop would have attained its utmost expansion at an earlier part of the season, thus allowing the whole force of the termination of summer and the beginning of autumn to be expended on the maturing of the secretions of the plant. It is also in accordance with all experience that vegetation meets the advance of the cool damp weather of autumn safely, almost exactly in the proportion of its maturity. The full realization of this idea, however, involves the use of such varieties of any plant under cultivation as admit of sufficiently early maturity in ordinary seasons. I am well aware how this subject presents itself to the cultivator of the sugar cane. His first object is a heavy crop of cane, in the hope of a correspondingly large return of sugar. But, in a climate presenting all the imperfections of ours every cultivator must make his choice between a larger crop of possibly diseased cane, or a smaller one of probably healthier. Sugar canes grown in very rich soils are found to be inferior in quality of juice of which a double quantity is needed to make a given amount of sugar. (See Patent Office report, 1855, p. 275.) This is an indication that much manuring will prove injurious in such a climate as ours, especially with the late maturing and exhausted sorts now in use. Indeed, such stimulation only interacts with the other unfavorable conditions, and thus more rapidly and effectually precipitates it into disease. With a better stock of seed cane, a longer season and a more congenial clime, there would be little danger in the most generous application of manures. Such a climate would secure health under almost any circumstances of impulsive culture. It is plain then, that the safety with which manures are applied to the culture of the cane in tropical regions is but an imperfect guide to us.

c. Rotation of crops.—Whatever may be the cause, whether the gradual exhausting of appropriate nutriment in the soil, or the deposition of excrementitious poison, few plants bear culture on the same soil through many successive years. Cruciform plants, such as cabbage, radishes and turnips, I have found especially injured by such consecutive planting. The injury in this case I think, is occasioned by excrementitious poison rather than by

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exhaustion. Corn on the other hand never seems to suffer from this cause. In August, of 1842, I saw a large field of corn, in Licking county, Ohio, on the farm of a friend, which was said to be the thirty-seventh successive crop grown on the same ground; yet it stood, in what was considered a bad corn year, thirteen feet high. From the analogy of Indian corn to the sugar cane, I should infer that the latter would bear continued cultivation through many successive years, provided the soil were naturally highly fertile; and such I believe is found to be the fact. I have previously suggested that, in the wise culture of cane there need be very little if any exhaustion of mineral elements in the soil; yet as every soil is not constituted with a high degree of fertility, and as all culture is not wise, it is certainly advisable, from general agricultural analogy, to rotate the culture of sugar cane with other crops whose draught upon the soil shall be most dissimilar to that of the sugar cane.

d. Mechanical culture.—The more frequently and deeply a soil is stirred about the plant, provided due care be had of the roots, the greater will be its progress. In a perfect climate and a long season this might be done fearlessly; but in a short season and with an imperfect climate, and in the use, moreover of feeble and late growing varieties of any particular plant, such a course of culture becomes harmful in the same way that high manuring does in the section above. In both cases, and especially where they act jointly, the plant is provoked into a late and immature growth, which greatly jeopardizes its health. I do not know what the facts are in the actual mechanical culture of the sugar cane further than that "the cultivator's aim is to get fine large canes in as short a period as possible. (See Patent Office report 1848, p. 286.

e. Wide planting.—Few facts are better established in agriculture than the superior health of plants when planted at such distances as admit of the full enjoyment of air and light. These influences being indispensible conditions of vegetable growth, any diminution of them, especially in a tropical plant, must be greatly injurious to its prosperity, and result in lessened health, size and value of secretions. Wide planting is found very important in the culture of Indian corn, not only to its health, but also to its development and productiveness. Close planting is very noticea-

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bly opposed to the health both of the grape and the potato, and very prejudical to the fruitfulness of all other tropical plants.

RECAPITULATION AND CONCLUSION.

1. CAUSES OF DISEASE.—If the foregoing reasoning, both direct and analogical, be correct, and the report of facts quoted in the culture of sugar cane be correct also, the disease of that plant (even after making large admissions for the possible influence of exhaustion of the soil, in many cases, from long cropping,) is referable

a. To climate considered as too cool and fitful, and presenting a season too short for the maturity of the crop. This, I suppose, is the great cause.

b. To the too long use of cuttings, often very unwisely chosen from the most unripe cane, frequently injured during the winter season, and derived from varieties of the cane not adapted in season of maturity to the climate of the sugar growing States.

c. To a soil often naturally or artificially too rich or impulsive, which, joined with a course of culture often too stimulating, provokes the late growth, and consequent imperfect maturity of the crop, especially when planted too thickly.*

2. THE IMMEDIATE REMEDY.—If the preceding view of the *causes* of disease be correct, an immediate remedy would involve:

a. The selection of soils of but moderate fertility, and those well drained, and naturally, from mechanical structure, warm, especially for the culture of seed cane.

* I do not know what may have been the influence of the last summer on the sugar cane at the south. At the north the season was very dry. If it were but moderately so at the south there may have been a sound crop of cane. Although genial years, like 1852, may occasionally give such crops, I have no hope in the ultimate success of its culture in the use of the present varieties. After the first impression of potato disease was a little mitigated, the hope was confidently expressed that it would decline and disappear. To my surprise such a hope has been recently expressed in a high place; but every habitual and observing cultivator knows that such a hope is utterly fallacious. As long ago as 1847, I expressed my despair of any such desirable result being ever attained. (See Transactions of N. Y. State Ag'l Society, 1847, p. 455.) An even tempered season will give good crops even with the old sorts. So also very dry seasons, as 1854 and 1856, will give sound though scant crops. But changeful years as 1846, or hot damp ones as 1850, 1851 or 1855, are sure to disease it. The Yam of New-Jersey, the imported Rough Purple Chili, and a few seedlings, are the only uniformly reliable sorts known to me. Others occasionally do well in medium soils and on northern slopes, especially if dug early. So I apprehend it will result with the sugar cane. Exemption from disease in particular soils and seasons, is in harmony with well-defined physiological laws; but it by no means disproves the existence of inherent and sure tendency to speedy ruin, of all the old varieties, alike of the potato and the sugar cane.

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b. The use of cuttings from the strongest varieties, carefully selected, and carefully wintered.

c. A coarse of culture not too protracted in the season, and at such distances as shall secure the highest influence of sun and air.

d. Such a rotation of crops, especially on soils not best adapted to the culture of the sugar cane, as shall give the soil adequate rest.

3. THE REMOTE REMEDY.—*a.* The procurement, from some climate, appropriate to the culture of sugar cane, of cuttings of varieties adapted, in hardiness and earliness of maturity, to the lcimate of the sugar growing States.

b. The procurement of the true seed of the cane, either from tropical regions, or from the cuttings just mentioned, the preference being given to seed produced in our own country.

c. The procurement of new varieties from such seed,—varieties hopefully invested with high climatic adaptations.

d. The cultivation, annually, of a small plat of cane, in the manner indicated under the immediate remedy, hoping thus to secure cuttings for seed cane of the highest quality, for the perpetuation of the species.

e. Appendix to the remote remedy.—A substitute for the sugar cane.—Should the preceding suggestions of an ultimate remedy not be fully realized in experiment, we may be led to seek a substitute for the sugar cane. Indian corn has long been known to be rich in sugar. On the same soil and with the same climate and culture, its weight of herbage would probably be equal to the cane.

From the higher adaptation of the species to our climate, it could usually be relied on for a healthful crop. The use of seed, grown farther north, for a part of the crop, would enable the planter to have ripe corn at as early a period as he would be found ready to begin the process of grinding and boiling. The labor of destroying the embryo ears, (were that found needful to give richness to the sap), would not be found expensive. Its use as a source of sugar at the north, was long since suggested. At the south the longer season and hotter sun would give the plant larger development and greater concentration of sap, provided it

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were cultivated on a sufficiently dry soil. Its softer cortex and pith would facilitate the grinding. We should not forget, also, the superior facility with which its waste matter could be converted into manure, and returned to the soil.

The use of Indian corn as an annual seedling would avoid all the troublesome facts connected with the present deterioration of cane. The process of planting and culture would also be cheaper.

What the drawbacks on this plan might be, I can not say. I suppose, however, that the percentage of sugar might be much less. So, also, the chemical state of its sap, as related to fermentability and granulation, may make it inferior; though of this I know nothing.

On the subject of the relative amount of sugar in different parts of the plant, and at different periods in its progressive growth, the reader may consult the "Prize Essay" of Prof. Salisbury, in the Transactions of the New-York State Agricultural Society, for 1848, p. 677 to 845.

In this search for a substitute for sugar cane, we should not forget the newly imported *Chinese Sugar Cane*,—a plant well reported of in regard to hardiness, timely maturity, and rich juices.

It is very important to notice that the substitution of this plant, or of Indian corn, would greatly extend the latitudinal area of sugar growing, carrying it as far north, doubtless, as the line of 40°, instead of its present limits of 32½°.

When the foregoing was first written, I was not aware of the wise action of the United States government, in sending abroad for such seed cane as I have described. I do most fervently hope that the suggestion which I have made, relative to the *true seed* of the sugar cane, will be carried out also. Nor should such renewal of seed cane be sought for from highly tropical regions, however healthfully the cane may grow there. That were but to perpetuate existing difficulties, by introducing varieties which must decline, in a few years, under the infelicities of our climate, unless renewed from the true seed.

JOHN LUNAN ON THE SUGAR CANE IN JAMAICA.

Since the preceding article was written a friend has put into my hands—HORTUS JAMAICENSIS: or a Botanical description of the

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indigenous plants hitherto known, and also of the most useful exotics in the island of Jamaica. By JOHN LUNAN, in two vols. quarto—the second vol. (the only one which I have seen) containing 400 pages was printed in 1814. This work devotes ten pages to the natural history, culture, &c., of the sugar cane. From its pages I make extracts corroborative of some of my positions in the preceding article.

"The root of the sugar cane is jointed, like that of other sorts of cane or reed. From this arises four, five or more shoots, proportionable to the age or strength of the root, eight or ten feet high, according to the goodness of the ground. *In some moist, rich soils canes have been measured nearly twenty feet long, but these were not as good as those of middling growth, abounding in juice, but having little of the essential salt.* * * * * The flowers are produced in panicles on the top of the stalks. They are from two to three feet long, and are composed of many spikes nine or ten inches in length, which are again subdivided into smaller spikes. * * * The seed is oblong, pointed and ripens in the valves of the flowers. It has been asserted that the sugar cane is not indigenous in America, but that it migrated through Europe, which may be doubted, as Father Hennepin, in 1680, found it growing near the mouth of the Mississippi, for thirty leagues; and Francis Ximens, Hernandez, and Piso, all affirm that the sugar cane grows spontaneously near the Rio-de-la-Plata. Jean de Leary, who went to Rio Janeiro, in 1556, also asserts that he found every where a great quantity of sugar canes. It is thought by some that Columbus introduced the plant into Hispaniola in his first voyage; but the opinion that it may be a native of America and the West Indies is much strengthened by the sugar cane having been found in such plenty in the South Sea islands.

There are several varieties of this valuable plant; but the cultivation of all has been for some years past greatly neglected to make room for the Otaheite or Bourbon cane, which was brought here in 1796, and has since been generally cultivated. This cane is of a much larger size than any other, the joints frequently measuring eight or nine inches, and of a proportional thickness; the common cane seldom exceeds two or three inches. They have consequently been found very productive, and their sugar of a

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superior quality. * * * * The juice of the Bourbon cane is of a paler color, and they are ripe enough to grind in ten months. From their size they resist dry weather much better than any other cane, and are not nearly so subject to suffer from that destructive insect, the borer. With all these seeming advantages, it is no wonder if they entirely supersede the use of all other varieties of the sugar cane in Jamaica. *They, however, more speedily exhaust the soil, and it may be questioned, whether in the course of time, they will not themselves dwindle from repeated transplantations in a foreign soil, which all exotics do; and which, indeed, has already been found the case, in a considerable degree, on many plantations.* The old cane, it is acknowledged, possessed richer juices than the new, and its tops afforded a much greater quantity of food for cattle, which considerations added to that of their not impoverishing the soil so much as the other, render it very doubtful whether the ultimate benefit will be so great as was anticipated."

The portions of this extract to which I wish especially to draw attention are those in italics. This work was written more than forty years ago, but already, even then, the Bourbon or Otaheite cane, which the Louisiana writers consider as two different sorts, and which, under the name of Bourbon, is the one there principally cultivated, was beginning to shew signs of failure in the climate of Jamaica. It is not wonderful therefore, that it is now rapidly deteriorating in that of Louisiana. In both localities large size of cane—the result of too impulsive culture—is attained at the expense of deterioration in quality of juice. In many specimens of West India cane seen in the sugar hogsheads of this city, during the past winter, I have noticed that they were all shorter jointed than the reported length of the Louisiana cane, the result obviously of a less impulsive and so more healthful course of culture.

III. APPENDIX.

SUGGESTIONS ON THE MODES AND DIFFICULTIES OF REPRODUCTION APPLICABLE TO THE RENEWAL OF THE GRAPE AND THE SUGAR CANE.—*The Grape.*—1. So frequently do we find the value and availibility of many vegetables, and especially fruits, limited by no very distant lines, both of latitude and longitude, that we are constantly to keep in view the necessity of securing the highest adaptation

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by originating them from the seed near to the spot of their permanent culture.

2. The Isabella and Catawba grape have a very high character for the table, and the latter also for wine. When perfectly matured they bear a favorable comparison with the best grapes of Europe; but they are varieties most appropriate to their native region in about lat 33° to 36°. In a very fine, long season like 1852, or a dry one like 1854, they ripen well at Utica, and in less favorable seasons they are still cultivated successfully in the valley of the Hudson below the highlands, and on the southern shores of lakes Ontario and Erie. But as varieties, they are not permanently reliable, on a wide extent of latitude, further north than 40°. Indeed, they have mildewed badly on that line in Ohio, and south of it in Kentucky.

3. The Diana is favorably known to the public as a most valuable seedling. The Rebecca, Delaware, To-Kalon, Union Village, Concord, Carter, and perhaps others, have been very recently commended to public notice.

4. Other varieties as the Charter Oak, of the most worthless character, have been imposed on the public by persons interested in their sale, or too ignorant to be constituted adequate judges of the quality of a grape.

5. A few foreign sorts, such as the Early Black July, Miller's Burgundy, Violet Chasselas and Golden Chasselas (Royal Muscadine of Downing,) with some others, ripen early always at Utica, in latitude 43°. When cultivated as directed in the preceding pages, they may generally be secured from mildew. The last of the above list is a most magnificent grape, both in cluster and berry, and, in warm, dry seasons, of the highest quality.

6. We need a grape as hardy as the Fox grape, and as valuable for the table as the Isabella, Catawba or Golden Chasselas, and ripening as early as the latter, or even, for some localities, as early as the Black July. Such a grape must be a native, since it is conceded that no valuable varieties of foreign grapes will uniformly succeed here, especially in cheap out-door culture.

7. Some hasty theorizers do not relinquish the idea of improving the native wild grape. But it is sufficiently proved that, however hardy and productive some of them are, and however large the berry and early the maturity, they can never be made

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to change the crude juice, hard pulp and peculiar fragrance that marks the most of them. (See the Horticulturist of Sept., 1847, p. 122.

8. I cannot but desire a thorough exploration of some of the valleys of our northern rivers, as the Hudson and the Connecticut, in the hope of finding native varieties, if not of the highest excellence, of sufficient value to be worthy of extensive culture.

9. We seem then, considering the question of the high value and wide availability of the seedlings already originated, as unsettled, driven to make additional efforts to procure a seedling grape combining hardiness, early maturity, free bearing and high quality for the table. There are two modes of accomplishing this.

a. We may plant the seeds of wild sorts in the hope that, under the power of culture, they may sport into new and valuable varieties. The same may be done with the seeds of the old valuable sorts. Experience, however, proves that the seedlings from such sources are seldom much improvement on the parent; those from the wild one being wild still, and those from the luscious, foreign sorts often proving wild also. Such results, indeed, were to be expected from the analogy of the apple, peach, pear, &c.

b. The method by hybridization is superior to the former, since by it we are able, with certainty, to combine the very different and yet valuable quality of very different sorts. See remarks on this subject in the Horticulturist, volume, 2d, p. 113; vol. 3d. pp. 21 and 291. A cross made in this way between such varieties as the Hesperione, Black Hamburgh or Golden Chasselas, with such native sorts as the Isabella or Catawba, would be likely to result in new and valuable sorts, combining the lusciousness and freedom from pulp of the foreign with the hardy constitution of the native sorts. Those familiar with the process of hybridizing advise the assumption of the hardy variety as that on which to operate, while the pollen from impregnation should be taken from the foreign sort. Mr. Lindley sums up the results of such experiments thus: (See Horticulturist, vol. 3d, p. 25.)

"1st. The character of the male parent becomes more fully developed in the flower and parts of fructification in the progeny, than those of the female. 2d. The character and constitution and foliage of the female are, to a great extent, transferred to the progeny."

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10. A valuable sort obtained by such means, and having the early maturity of the Golden Chasselas; or a sort ripening as early as the Black July, for the more northern grape growing region, would constitute a most valuable acquisition to our country. With such varieties we might cultivate the grape, if not cheaply, yet at least with a certain degree of success, from 42° to 44° north lat., while farther south it might be produced in cheap abundance.

11. I will risk a conjecture on the probable future success of grape culture in the northern States, north of 42°, excepting that portion which lies immediately south of lakes Ontario and Erie.

It is admitted that the wild grape grows freely over most of this section of the Union, but we are not thence to infer that valuable cultivated sorts, brought under the ordinary regimen of garden culture, would flourish permanently.

a. The wild grape, in its native vales, and at the foot of hills, finds usually a choice soil, where it grows without culture, while its roots are usually mulched with grass, the falling leaves and branches produced by itself and the neighboring trees. From its position, in a deep and usually loamy soil, or near some stream, it is protected against extreme drought. Not being cultivated, it does not usually germinate until all danger of spring frosts is past; while, for the same reason, it does not protract its growth into the extreme autumn. The integrity of its structure is not interfered with by the pruning knife. Thus situated, it bears moderate and often large crops of fruit annually. As fearing frost it seems allied to tropical vegetation, yet it is, in effect, a hardy vine. Our forests present many such vines, densely covering the tops of tall forest trees, or covering many rods square of lower shrubs. Many of these vines are apparently hundreds of years old,—a proof that adequate provision is made in the character of the soil about them for long life.

b. Now let us transfer a cutting or layer of such a grape into our gardens. Make the soil about it artificial and rich. Cultivate it deeply and early, and continually through the season, forcing it into an early development, and protracting its autumnal growth. Let the sun blaze about its roots unprotected by any sheathing of the soil. Destroy the natural balance between the

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expansion of its vine and roots by the modern system of pruning. I say—do all this, and what will be the consequence? Its wood and leaf will be enlarged and sappy, and the result of its annual growth of branches will be spongy and vascular, in short, immature, and no longer able to bear the sudden changes and hot intensity of summer, or the severe cold of winter. Should it be retorted that my argument will be equally applicable to *all high culture of other fruits also*, I answer,—true, it has a slight bearing in that direction, and certainly indicates the importance of moderation in the culture of fruits in such a climate as this. But the grape is unlike our other and hardy fruits. They do not fear ordinary vernal and autumnal frosts, the least touch of which destroys the foliage of the grape. They none of them present the spongy wood of the grape.

c. The character of all vegetable secretions depends on the structure of the vascular system, especially that of the leaf, since it is in that system that its elaborations are performed. Now there is some ground for the opinion that very delicate fruits, of any one species, have, at least very often, a more delicate structure of elaborating machinery than other varieties of fruit of the same species, but of less delicate qualities. This is not of course illustrated by the Seckel pear, nor by the Swaar apple. But it is seen in the general comparison of tropical with hardy fruits, and of our more delicate plums, cherries, and pears, with those that are less so. So far as there is truth in this position, we are not to expect usually to obtain fruits of rare delicacy but at the expense of such a course of culture as shall make the plant itself delicate in constitution, and require a continued course of culture conformed to such constitutional delicacy,—a thing not fully and cheaply admissible in such a climate as this, as it already appears in the cultivation of the foreign grape and the peach.

d. Once more: Delicacy of vegetable secretions depends not only on some inscrutable mechanical structure of elaborating machinery in the leaf, limb and perhaps fruit itself, but it depends still more on climate. This is evident in the comparison of tropical with hardy fruits, and that of melons, plums, peaches, &c., in a hot, dry season, and one cool and wet. We may suppose then that fruits of exquisite delicacy require a rare combination

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of elaborating machinery, appropriate soil, and especially appropriate climatic influence. Now, this last circumstance is what we are least able to control. Fruit trees of rare quality may be imported, and the soil can usually be artificially made appropriate, but we cannot control the climate. The inference from all this may be that, with such a climate as this, we may never be able to realize habitually the culture of a grape at once hardy, early, and yet equal to the Golden Chasselas, Black Hamburg or Hesperione. On the other hand, our possession of such fruits as the Spitzenburgh and Swaar apples, Seckel and Virgalieu pears, Washington Bolmar and Green Gage plums, ought to encourage our wise and patient efforts in the direction of acquiring such a grape as has been suggested.

I may be allowed, in conclusion, to allude to what has been so often and variously hinted in the preceding essay, that the procurement and permanent enjoyment, in open culture of such a grape, as has been supposed, must depend on the exercise of universal moderation in every office of culture that relates to it. Highly stimulating culture, in such a climate as ours, makes war upon nature, or rather nature's God, when applied to the grape.

The renewal of the Sugar Cane.—a. Here the labor of reproduction, whenever good seed has once been obtained, would probably be much less than in the case of the grape. As the Indian corn, broom corn and china sugar cane exactly reproduce themselves from seed, so doubtless would the sugar cane.

b. Indian corn has a wonderful power of speedy adaptation to length of season, when transfered from place to place. The law of its production seems to be that, where it can find even nine or ten weeks of dry, hot weather, as in the valley of the Red river in lat 51°, and in that of the St. Lawrence in 47°, there it can be produced. (See report of Patent Office 1853, p. 346, &c.)

c. The sugar cane, on the other hand, requires constitutionally a higher degree of heat, and aside from that, does not probably possess the same pliancy of adaptation to shorter seasons, and thus for both reasons can never perhaps be carried as far north as the Indian corn.

d. Could it, however, by reproduction from the seed, be brought within the limits of six months of growth, instead of requiring, as now, nine months in Louisiana, (Patent Office report of 1848,

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p. 284,) might it not find summer's heat enough as far north as perhaps lat. 37°, (which is the northern limit of North Carolina, Tennessee, and Arkansas,) instead of, as now, being confined by a northern limit of 32½°. The last line is at present its utmost northern limit, with the exception of the immediate valley of the Mississippi, where its culture extends to 35°. (See Patent Office report, 1853, p. 361.) At the point suggested, 37° north, it might probably find, in central summer, nearly as high a heat as in Louisiana, and with a shorter summer's growth, it might, though making less weight of cane, produce that which would be equally available for the purpose of sugar.

e It would be a singular fact in vegetable physiology, if no ready and certain mode of the reproduction of sugar cane from the seed could be discovered. This idea should not be seriously entertained. The solution of this question might well, if needful, invite the attention of the general government, or of some of the State governments.

f. The labor not only of obtaining real seed, but of drawing from it varieties at once hardy and otherwise available, may involve both time and patience; but I think there could be no doubt of a favorable result. My experience in the culture of seedling potatoes affords an analogical argument demonstrative in its bearing. In those experiments success resulted from one reproduction where the variety producing the seed-balls was suited, in season of maturity, to our climate. In the case of varieties imported from South America, and requiring a much longer season for maturity than was afforded here, a second and even a third successive reproduction was needful. In every case of patient continuance, eventually, valuable new varieties were obtained; that is, such as were suited, in time of maturity, color of flesh, shape, &c., to the wants of our country. From the disposition of the potato, like the apple, to sport into varieties, such valuable new sorts were comparatively few.

g. My experience in the importation of foreign varieties of potatoes, is also pertinent to this subject. Here, a variety imported from Bogota, failed entirely in five or six years. Bogota is situated just north of the equator, where vegetation never ceases, and yet at so great an elevation as to present a climate too cool for the best culture of the melon and the tomato. The other

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extreme of this experience was in the case of a variety grown in the immediate vicinity of Valparaiso, in 32° south lat. This failed the first year to form any tubers, and so was entirely lost. In only one case out of twelve varieties, imported from South America, was the variety found adapted to our climate.

h. If cuttings of the sugar cane, of sufficient early maturity, and vigor to bear seed, could be introduced into our sugar growing States, they would not only themselves become immediately available; but would probably at once afford new seedling varieties, or rather, judging from the analogy of Indian corn, and broom corn, would afford a single variety like the parent, except that it might exhibit a shortened season of maturity. This new seedling variety, it may be supposed, like Indian corn and its other associate congeners, would become immediately available for plantation purposes, unlike tulips and peonies which attain maturity only in from five to seven years, and unlike potatoes which, though capable of forming nearly full size tubers the first year, do not acquire a fitness for the table short of three or four years.

i. In judging of the valuable qualities of tropical plants of the same species, though of different varieties, a distinction should be made between the quality of early maturity and hardiness, the two things by no means always implying each other. The present experience of the sugar growing States, shows that, of the existing varieties of cane, the *Bourbon* and *Red Ribbon* varieties are much more hardy than the *Green Ribbon*, *Creole* and *Otaheite* varieties; but whether there is a difference in their maturity does not appear from published notices.

The analogy of other tropical plants may be useful to those who labor for the reproduction of the sugar cane from the seed. Thus,

1. Beans.—The *Lima* bean requires more heat than any other we cultivate. It needs a higher temperature for its healthful germination, and a longer season for its maturity. The *Mohawk* bean, on the contrary, grows with less heat, and at an earlier period in the spring, than any other variety. Indeed, it will recover from a light injury by frost. Again, the *Lima* bean, though an annual here, is a perennial in the happy climate of Liberia. So, also, the *Scarlet Runnner* is perennial, even here,

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where its roots, standing in the garden all winter, will sometimes germinate the succeeding spring.

2. *The Musk melon.*—Of these the *Persian* is very tender to climatic influences, and requires occasional protection all summer long. The variety here known as the *citron*, but corresponding very nearly with the *nutmeg* of Downing, is superior to all others in the resistance of the chills and damps of autumn. In those years when frosts hold off, the fruit of the citron retains its high green color and luscious flesh long after other green and yellow varieties have declined, both in color of flesh and flavor. Such has been my experience in cultivating this melon for many years, in large quantities, by the side of many other varieties. The improver of the sugar cane needs therefore to aim at the double result—*hardiness* and *early maturity*.

j. The question, from what land of the nativity or of the successful culture of the sugar cane we should attempt its renewal here, is not readily answered. The localities whence it has heretofore been derived are all too near the equator, unless we can find in some of them elevated localities where it grows. We need, if possible, to find it growing where the degree of heat and length of season are like those of Louisiana. The most of the northern limit of China extends to 38°. A variety cultivated with success at that point might be hopefully cultivated here at the corresponding points, i. e. in Central Virginia, and Southern Indiana and Illinois. Whether the recently imported Chinese sugar cane will prove a tolerable substitute for the true sugar cane, and admit of a profitable culture in as cool a position as that last indicated, I know not, but from report, I think both probable.

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POSITION AND PROSPECTS OF AMERICAN AGRICULTURE.

BY PROFESSOR J. A. NASH.

B. P. JOHNSON, ESQ.:

Dear Sir—You some time since requested me to prepare an article, on the above subject, for the forthcoming Transactions of the New-York State Agricultural Society. Why I consented, is more than I can now account for, unless it was under the impression that you are so hard a worker for the cause of Agriculture, and yet so reasonable in your expectations of others, that it would be wrong for any one in the Empire State not to do, or at least attempt to do your bidding. Certainly it was not for the lack of a belief that there are thousands in this great State who would do what you have assigned to me more acceptably. But it has always been a rule with me to fulfil a promise, though it might better not have been made. In pursuance of this rule, the following thoughts are presented. Permit me, however, before going fairly into the subject, to suggest a few simple principles, which will be found applicable before I get through.

1. It is often said by persons who seem to themselves to have discovered something important, that it takes a great many sorts of people to make such a world as we live in. This is just as true as any other truism. There are a great many sorts of people —enough, in view of the wants of mankind, to do everything that ought to be done, to say nothing of things that ought not to be done. Of the former, it is desirable that each thing should be done by persons who possess a fitness for the very thing they undertake.

2. Nevertheless any thing like a perfect fitness between men and their employments is not yet seen, and probably will not be soon. Some men will preach the gospel, who are not willing to live by it, and some, who have precious little power to per-

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suade others to live by it; some will practice law, who would be the last to obey law, and some who have small ability to secure our legal rights to us, if we apply to them for that purpose; some will doctor us to death in cold blood, and some will kill us with medicine, when most anxious to save us. It will be so in all the employments. There will be farmers, who are not fit to be farmers; mechanics who are not fit to be mechanics; and merchants who are not fit to be merchants. Natural inaptitude, or unfitness for a chosen employment will sometimes be the cause; but ten times oftener the person himself will be in fault—will not qualify himself for the employment he has deliberately chosen and so will dishonor it, or at best, will do little or nothing to cause it to be respected.

3. Just in proportion as any calling is occupied by men unfit for it, it will sink in the estimation of mankind. It will not avail to say that the calling would be eminently honorable and useful, if filled with the right men. Mankind estimate their fellow men as they are, not as they should be; and as they judge the men, so they honor or despise the calling. As wicked or ignorant men in the learned professions, destroy the respect naturally conceded to the ministers of religion, the expounders of law and the practitioners of the healing art; and as unskilful mechanics and trickish merchants destroy that due to their calling, so ignorant, unskilful farmers fritter away that due to theirs. Their employment is the heaven appointed employment for about half of the human race. If God is kind, it cannot be an employment which necessarily degrades those engaged in it. It is not such an employment. It may be degraded by lack of moral worth, or want of intelligence in those who pursue it; but it can degrade no one. It is eminently compatible with those high moral, intellectual and social qualities, which ever have commanded, and ever will command the respect of mankind.

4. If the farmers of any country do not maintain an elevated position; if they do not wield a strong, social and political influence; if they fail to enjoy a fair proportion of the government patronage, the fault is somewhere else than in their employment. I am not here to inquire where the fault is; but that it does not inhere to the employment itself, is sufficiently evident from the fact that in all farming communities there are some who stand

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deservedly high, not merely as farmers, but as men of ability, position, influence—such that if all farmers were like them, the profession would be looked up to. It could no more be seen by looking down than the sun at mid-day can be seen by looking upon the ground. Not all of these are favorites of fortune, nor of genius nor are all subjects of the best possible early training. Many of them have *executed* a fortune out of the sod, instead of executing the last will of a friend. They were not born of genius, nor were they well educated in spite of themselves. With no inherited wealth, with no innate skill for managing the farm, they have made their fortune and made themselves—are self-endowed, but well endowed; self-made, but well made—and there are enough of them to prove the assertion that agriculture, as an employment, does not *necessarily* keep the farmer down in the world, and that if he fail to rise the cause must be looked for otherwhere.

5. A great number of causes may operate to keep the farmers of a given country below the position of self respect and general esteem and public influence, which all right-thinking men would wish them to occupy.

The government may be in the fault, partly by not extending a wise forethought to the great interest of agriculture, but ten times more, by not encouraging those other industrial arts, which, if prosperous, are sure to create an active demand for farm produce. Exportation of farm produce is a good thing. It is well that we have always had some demand from abroad; it is well prospectively, that the demand is likely to increase; but you may talk about exportation till the end of time; it never alone will make a nation prosperous. That a people, with vast resources like ourselves, may be comparatively prosperous for awhile, in spite of the folly of importing one-half of all their manufactured goods, is admitted. But the tendency of exchanging agricultural produce for manufactured goods always has been and always will be, to impoverish the nation that does it. It is not what the farmer wants. If he can half-feed the starving foreigner, who is forging his log chain in Scotland, after the between-men have taken fifty per cent. of what the consumer there pays, it is something; but it is not enough; the farmer wants the privilege of feeding the forger of his chain to the full, not of half-feeding him; of feeding him at hand, where he can take all that the forger

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pays, not a diminished half, leaving the larger half to fatten a long row of speculators and carriers, anybody and everybody but himself, out of his labors. Dependence on foreign manufactures has no tendency to enrich a people. If a nation thus dependent becomes rich, it is from other causes—is not in consequence of this dependence, but in spite of it; and agriculture can never flourish steadily and for long periods, nor agriculturists rise to their deserved position till nearly all the wants of a country are supplied by home and not by foreign labor. Let the sound of the anvil, the hum of the spindle and the buzz of the shuttle, mingle with the lowing of herds, the bleating of flocks and the haw buck gee away bright of the plow-boy; let the farmer and the mechanic exchange products freely, without a dozen sticky hands between, each receiving all that the other pays, and both will flourish, because each will receive the whole value of the article furnished by him, be it a bushel of wheat, a quarter of veal, a hand-saw, a cradle or a churn, instead of dividing it with a dozen carriers and schemers between the two.

The farmers themselves may be in the fault by failing to inform themselves as well as men in other callings, by not being read up in the great improvements in their own business, by going on uninquiringly in the production of small crops, at a dear rate, when it would be quite possible to produce larger crops, at a rate cheaper in proportion to the quantity produced; by not observing the state of the markets and so allowing speculators to get the advantage of them, and generally by failing to cultivate in themselves those qualities of the farmer, the man, the gentleman, which necessarily, as society is constituted, command esteem, respect, influence. Industry, integrity, intelligence, go far to make the man and to give him position. But these are not all. The appearance of his home, his personal appearance when abroad, his style of conversation, intelligent or otherwise; ability to use his mother tongue correctly, and to converse sensibly on all subjects of general interest, have something, much, to do with standing, position and influence. We do not wish the farmer to bankrupt himself by a vain effort to outdo the follies of all the hards and softs in uppertendom; but with the innocent usages of society, as far as compatible with his means, he should conform; should allow his family to conform with them; encourage them even, if necessary;

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and cheerfully promote the requisite means. It would not be well for him to ape the dandy. He would be apt to make poor work of it if he did; and the object would not be worth the wool if he should gain it to perfection. But he should be farther from the clown than from the dandy even. There should be nothing out of good taste and sound propriety; nothing shabby about him or his household. One farmer with shabby premises, a shabby person and a shabby family, does more to make the profession despised than two of his best neighbors can to make it honored.

Again, circumstances not attributable to the government, nor to individual farmers, may for a time operate unfavorably. Our own colonial history is an illustration. No governmental influences, emanating with ourselves, crushed the farmer. The farmers of those times were a high-minded set of men, as true to themselves, at least, as those of the present day. But there was the difficulty of manufacturing in a new country; there was a necessary dependence on foreign manufacturers; there was much perversity and more ignorance on the part of the English government; our fathers were not allowed to manufacture such articles even as they could have produced advantageously; the best they could do was to import them and send abroad agricultural produce in pay; one consequence was that nearly all the people turned their attention to agriculture; another was that in spite of all exportation of produce, there was an over supply at home. As late as the beginning of this century, the fore quarters of veal, in the inland parts of New England, were thrown to the pigs; the hind quarters were sold for two and a half cents a pound, and pay taken in miserable India cotton at fifty cents a yard; if the lawyer wrote a dunning letter of three lines at the farmer, it took about twenty pounds of beef or veal or pork, or nearly half as many pounds of fine fresh butter, to pay for the job. Everybody in those days were well paid, except the farmer. He was paid almost nothing. All that time it was as difficult as now for the poor to get food, for though the farmer asked but little for it, the poor man could not get that little in money, or anything else that would be taken in pay. This was a pretty good illustration of the policy of exporting agricultural produce in exchange for foreign manufactures. It was amazingly depressing to the cultivator of the soil. No wonder the best lands were

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worn out, and that the inferior were not brought into cultivation. Here was little motive for preserving the one, or reclaiming the other.

Now it is different. Our dependence on foreign manufacturers is partially shaken off. American ingenuity and energy is furnishing a portion of our manfactured goods. A home market is furnished. The farmer is receiving something for his labor, as well as the lawyer who writes a dun for his special benefit. We are approaching that state of things, slowly but surely, when the working men of the country, those who create all its wealth, will be so justly distributed between the field and shop, the one furnishing the food and raw material, the other turning out the manufactured article, that the different classes, the farmer on the one hand and the manufacturer on the other, will mutually sustain each other. For the last three years, agricultural produce has perhaps been as high as it is desirable that it should be. May it never be lower. The poor even—those who are willing to be industrious, would not be benefited by reducing it. But our only hope, that agricultural produce will remain sufficiently high to fairly reward the labors of the husbandman, lies in the expectation that at no distant day, we shall have a full supply of iron, steel and hardware, of cutlery and mechanics' tools, of clothing, of whatever we need, out of our own soil and mines, in our own shops, by our own laborers, fed to the full on the produce of our own farmers. This and nothing else will secure stable, permanent prosperity to the great Agricultural interest of the country. When the wheels turn by the weight of every tumbling stream, and the shops sing all over the land there will be somebody to consume the farmers' produce, and *to pay him for it.*

The subject in hand naturally divides itself into two parts:—
1st.—*The position or present state of American Agriculture.*
2d.—*Its prospects.*

Of the present state of American agriculture, it is safe to say, that it is a vast improvement on anything past in this country. Half a century ago it had sunk to a pitiably low condition. Some of the causes have been already alluded to. Owing to an abject colonial dependence, the farmer had scarcely a home customer. His only resource was to let go of a prodigious amount of his own productions for a precious little of any thing else that

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his family must have; fifteen or twenty pounds, for instance, of almost any kind of meat, for a yard of cotton cloth, that we would not now pay three cents for. What wonder is it that the farmers of that day failed to improve their lands, that they suffered their houses to become brown and decayed over their heads, that they themselves became dull, discouraged, vegetative, rather than active beings? The only wonder is that they did not lie down in the furrow and refuse to rise. The last thing we should do is to blame them.

As soon as other employments were opened, the more enterprising of the farmers' sons rushed into them. This was well, because it gave those who remained a few customers. But there was this evil about it: the less stirring and enterprising were left on the farm; and this made it a slower process for agriculture to emerge from its then low condition. It has emerged, nevertheless. Much is due, at least ten times more than the world will ever give credit for, to the efforts of the pioneers in agricultural improvements, such men as Col. Pickering of Massachusetts, and Col. Skinner of Maryland. By most farmers their writings were ridiculed. They persevered notwithstanding, and the good effects of their labors have been seen since their death, if they were not before. There is a tendency in farmers to look with suspicion at the application of science to their employment; and this tendency is stronger in proportion as they are ignorant. It gives way as intelligence increases. There are now a hundred farmers who realize that there is yet something to be learned about agriculture, to where there was one fifty years ago. Then, the odium of reading an agricultural book was greater than men of no more than ordinary backbone could bear. Now, the earnest writer has earnest, sympathizing readers, ready to admit that there may be improvements in farm management, and desirous of adopting them as soon as they approve themselves to a sound judgment; and most farmers are now willing that their neighbors should *study* agriculture as well as *practice* it—will not expend all their wit against them, if found with agricultural books and papers in their houses, nor insist that quite all the money expended for such things is thrown away; and, what is very significant, will look over the fence and imitate the improved processes of their reading neighbors,—the book farmers, as many still facetiously

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call them. In this way agricultural improvement, over the fence, or under, or through, is spreading even among those who oppose it. The very men who hold *back*, are going *forward* in spite of themselves. With *some* farmers—it would not be true at this day to say of *many*—it is very much as it was with a certain horse, that once lived, more famous for using the after than forward part of the harness—when put into a team with trhee other horses, all true and good, he went forward, notwithstanding his propensity to *push* with the wrong end instead of *pulling* with the right.

That American agriculture was wretchedly low fifty years since, that it is now advancing, that the great majority of the farmers are desirous of increasing their skill and of bettering their condition, that the very *holders back*, though a little behind as the play of the gearing permits, are nevertheless going forward with the team, is all too evident to require argument. We are manifestly rising from a condition, in which belles and beaux sneered at the farmer, as if he must be a shabby, low-lived being of course, to that in which to be the owner of a well-cultivated farm will be honor enough to satisfy ordinary ambition. But whereabouts in the upward march are we? If we compare our progress to a journey through the Empire State from Albany to Buffalo, what is the point we have already reached? The Queen city of the lake does not heave into view. We see no Rochester yet, no Geneva, no Syracuse. Perhaps it would approximate the truth t say that we are approaching Utica. If so, we have come what was a pretty long journey in the old stage times, but there is a longer before us; and it depends very much upon what facilities we avail ourselves of, whether we shall soon accomplish it. Should progress on the farm be as rapid the next half century as that on the road has been the last, and should science be applied as intensely to agriculture as to other employments, results most honorable to New-York as a state, and to the American people as a nation may be anticipated.

In estimating the present position of American agriculture, let us look, not singly at the employment, as a sort of abstraction, but at the men who live by it, and who give all the rest of us a living. If the art could give plenty of cheap food, that might satisfy some, but we should not be satisfied unless it could elevate

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the men who practice it, to a higher platform than the world has yet dreamed of for this class. Agriculture might furnish food if serfs worked the soil. It is men, not things, that we are to look at. The plow is *something*, but the man who holds, *somebody;* he is, or should be, a pillar in this republic; he must be, or our boasted self-government will be as great a curse to our children, as it has been a blessing to us. If we could measure our past progress and mark our present position, let us see how much better the farmer of 1857 is educated than was the farmer of 1807. It is an implacable law of humanity that educated mind will tower above uneducated. A business that is done by educated men will always be honored; one that is done by uneducated, despised. You might as well personate Æolus and blow against the north wind, as oppose this law. First of all then, let us ask, how the farmers of the present day are educated, as compared with those of fifty years ago? Knowledge is power, whoever possesses it. There are other questions which throw light on this subject; what sort of houses do the present race of farmers inhabit, compared with those of their father's? Do shade trees, beautiful shrubs and fragrant flowers surround their dwellings? Is the grounds along their front so guarded that you can approach them on a moonless evening, without being pitched heels over head? Do they cultivate a large garden so as to make it at once productive and beautiful, and that without a waste of time on such trivial details as the farmer cannot afford? A tasteful garden prettily enclosed, and giving some luxury for every day in the year, is one of the surest marks of good judgment, of high refinement, and we will add, of common sense and of thrift. How is it with their barns? Are they better in appearance, more labor-saving, more preservative of the fertilizers, more comfort-giving to animals and to the men who care for them, than were to be found when the present century dawned upon us? Are they approachable without wading, or perchance swimming through something else than pure water? In short are they so constructed and so managed, that every ton of food expended in them will give just about twice the return in animal growth and product, and manure, that the same amount gave our forefathers? Some of them are, beyond a doubt; and this is a great stride in farming improvement.

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We might ask how many farms are wisely divided into lots, giving such sized lots as, with a just regard to expense of fencing, the labor of cultivation and the probable returns, will give the best profits? And we should find that many are now faultless in this respect—so laid out that the team, in cultivating them, can go ahead part of the day, instead of being always wheeled on its center. More men now than fifty years ago, comprehend that they can cultivate ten acres in the form of a square or an oblong with less labor and less manure even than would be required to cultivate as much in half a dozen crooked, unseemly patches, and that the ten acres in one field will produce considerably more than when dribbled out into half a dozen. It would not be far from the truth to say that it takes as much land to make nine one acre lots as to make one ten acre lot. The reasons why it requires less labor, less manure and less land to grow a given amount of produce in good sized fields, from five to fifty acres, than on patches, are too obvious to dwell upon.

How many more farmers now than formerly, understand the full benefits of deep plowing and fine tilth. Lands so prepared draw half their manure from the atmosphere; those skimmed over give half of that which you laboriously put upon them to the passing breezes. The deeply cultivated, finely pulverized field resists alike flood and drouth; the scratched surface suffers from both. Fifty years age, who knew that in most soils, if not all, deep cultivation with subsoiling, where experience shows it to be beneficial, and underdraining, where nature has not performed that office, was a complete guaranty against injury from drouth? The very teachers of agriculture had not *suspected* it. Now, half the farmers in the country *know* it, and the rest are learning it. Then few had any just conception of the profits and pleasures of fruit growing. It had not entered the heads of the best, that the farmer, by a little attention to the smaller and larger, earlier and later fruits, may revel in the purest, innocentest and sweetest luxuries the world affords, 365 days in the year, and have enough left for sale to meet all the cost. Now it begins to be understood; it begins to be understood also, that mankind will leave off their degrading vices when you will furnish them in abundance the pure and harmless luxuries of nature.

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In the best Agricultural districts, we find in the implements all over the farm, in the farm buildings, in the garden, in the orchard, in the laying out of the land, in its cultivation, in the front yard, in the street before the house, clean and grassy, except on the drive, in the highway through the farm, as if the owner recognized an obligation to keep things decent about him, or at least as if he thought it for his interest, that the wayside should not be a hot bed for mice and Canada thistles and other pests. One rejoices in such signs of thrift. There must be competency there, perhaps wealth. But this is only one of the indications—the least important. There are *men* there and women, and children growing up to be like them; and the premises show pretty well what sort of men and women the parents are, and of what sort the children are to be. If you rejoice in the signs of wealth, it is not simply in the fact that it is there, but that it is in the right hands. Suppose you are riding through a farming district—you come to a house that was old fifty years ago, but is older now; there was a front fence once, but there is none now; the ground in front is in pretty much such shape as the pigs choose to have; what a dirty apology for a garden! it is jaggedly fenced, and the weeds look as if the owner had too much important business on hand, to attend to so insignificant an affair as a garden; the cracks in the barn are wide; the sheds are falling; how cruel to winter a cow or two and a horse in such a place! You begin to think of hard names by which to call that man. But softly! farmers in this country have had a prodigiously hard row to hoe. Perhaps if you and I had been educated as he was, and put in his place, we should have been no better. *Possibly* he may have other virtues than his premises show. Think the best you can of him, and when you get by, don't look back, for there are other premises just ahead, on which your eye will rest with more pleasure. The street is clean as you approach—no thistles, no unsightly stone heaps, no flea-breeding piles of chips and sawings and old timber, no neglected choke cherry, covered with worms' nests, and producing fruit enough of a catterpillar kind to stock a whole farm and spread through the neighborhood. How beautiful and cool those shade trees are! Whether there is a moral in trees, by which men become better in their presence or not, there is certainly comfort and beauty. That garden has some

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size, some proportions, some decent laying out; is neatly fenced, fruitful, clean as paradise, when Eve hurried her husband out of bed early to grapple with the weeds. According to Milton, who knew all about that first name, she arose and went out to help him, partly, it may be presumed, as a standing example for her daughters. And then the house; in how high a state of preservation is it! Nothing there is going to decay. The barn, why, you would almost wish to be one of that man's cattle. You will not steal his fruit of course, but he would gladly give you some, if he knew how your mouth waters. The whole farm would excite your envy, if you are a bad man; your pride and your patriotism, if you are a good one. What a combination of the beatiful and useful! You may gaze as long as you please, and your perception of beauty, of fitness, of propriety and of utility will not be offended. Now if you think that man is rich, you may be wrong; if you think he has a competency, with qualities more precious than riches, you are probably right. If you think he has a wife as true to her position as he to his, you are probably right again. If you predict that the sons and daughters, after being educated in mind and hand, and after exercising a joint care and helpfulness with these parents, will be qualified to take care of themselves, or to go into another joint concern, it is probable that your predictions will come to pass. How beautiful is such a farm and its appurtenances! But after all it is beautiful chiefly, as an indication of the taste, refinement and high civilization with which enlightened Agriculture is compatible. There need be nothing low, ill-bred, or vulgar about it. There were hundreds of such farmers' homes fifty years ago; there are thousands now; let us thank God that there is room in our country for millions fifty years hence.

In view of the difficulties to be overcome in a new country, of the comparative poverty of new settlements, of the deficiency of working capital on our farms, and above all of the fact, that in our colonial, non-manufacturing condition, and for long years after we had escaped our pupilage, there was no adequate home market for farm produce, it must be confessed that the farmers of this country have done well. The country has owed them more than they have owed it. If, as an art, American agriculture does not yet equal European, it certainly comes as near to it as

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could reasonably be expected. Of its present position, comparing it with that of the most enlightened nations, we have more reason to be proud than to be ashamed. But are we to be satisfied? Shall we say it is enough? Shall we rest on our laurels? The answer should be no, never, till the art of our husbandry equals the magnificence of the domain to which we apply it; never, till the last vestige of the notion that the farmer is necessarily but a very common, plain sort of a man, is dismissed to pandemonium, where we suppose all sorts of errors prevail; never, till the whole body of American farmers shall rise to an elevation unknown in other lands, as evidently the conservators of the nation's laws and liberties as they are the feeders of its hungry mouths.

With regard to the *prospects of American Agriculture*, it may be remarked that great bodies move slowly; and the body of American farmers is certainly a great body. It took England from Alfred to Victoria to learn how to plow. Possibly we may learn it between the days of Washington and the seventh successor of James Buchanan. It requires long for even the leading minds to comprehend the few principles and practices of agriculture. It would be absurd therefore to expect a whole nation to comprehend them at once, or that any great reform in this line would be commenced and finished in a short time. The perfection of agriculture depends in a great measure upon the farmers themselves. No man living yet knows how to conduct a farm in the best possible manner. As the application of steam to the propelling of ships was a thing yet to be discovered in the early days of Fulton, so a thousand truths and appliances, destined to change and modify farm practice, are yet undiscovered. All we can say is, that as science is torturing nature with more intensity than ever before, and bringing out new truths more rapidly, there is some reason for believing that their application to the industrial arts will be more rapid. Some have supposed that because numerous discoveries have lately been made, few remain to be made, as if forsooth mankind had all the knowledge they ever will have.

When the Pennsylvania coal-heaver takes out one stratum, it brings him nearer to another, but not much nearer the end of those immense deposites. So if the miner after knowledge reaches an undiscovered truth, it brings him nearer to another undiscov-

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ered truth, and there is little danger of coming to the end. It is hardly possible that the ratio of discovery should be diminished, unless by sheer laziness on the part of scientific men; and this seems hardly probable at present. That there are plenty of discoveries to be made, that they will be made, that important applications will be made to all the industrial arts, and to none more than agriculture, may be set down as certain. Science will bless the farmer who cherishes her aid. She will go further: she will fulfil the christian injunction—will bless those who curse her. The farmer that rails at her teachings, will be reaping better harvests for them ten years hence. He is reaping better now even, though he may not know it; and he is reaping them more expeditious and with less exhausting labor. The farmer, of all others, should not undervalue science. Let him look at the discoveries she has achieved for agriculture, at the onward progress which her past achievments guaranty for the future, at the implements which, in conjunction with mechanic art, she has put into his hand, and see if he does not sow and mow, and reap and thrash, and perform almost every labor of the farm more easily for what she has done.

When the discoverer and the inventor, the mechanic and the farmer, with an enlightened faith in each other, each exercising a due respect for the parts which the others are to enact, shall work together for the advancement of the greatest art, more than has yet been dreamed of will be achieved. Since the days of scratching wheat into the ground with a crooked stick, of reaping it little by little, with a harsh edged knife, of thrashing it on hardened soil by ox hoofs, of grinding it by hand between two stones, and of baking it in hot embers, or in an oven excavated in the ground, great improvements have been made, but *greater are to be made*, if faith in science, in art, in human progress, is not altogether vain. There was a time when the sickle took the place of some inferior implement, perhaps of a straight knife. It would have been silly then to suppose that a better reaper would never be invented. It would be equally silly now to despair of a better machine than any yet in use for the same purpose. Some patriarch, it may have been Abraham, or a cotemporary, invented a rude sledge to be drawn over the wheat by oxen, as a thrashing machine. He and his neighbors had little

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reason to presume that no further improvement would be made; we, with the lights which science has since shed on the world, have less for supposing that our best thrashing machines are the *ne plus ultra* of improvement in that line. It would have been no more foolish for the man who first placed his spade across a wash tub and shelled an ear of corn on it, to have shut down the gate against further improvement in that direction, than for us to believe we have yet found the best possible corn-sheller. So of other implements. We have twice as many reasons for believing that ours can be improved upon, as the patriarchs had for believing that theirs could. So also is it with the powers and capabilities, which the Almighty has hidden among the recesses of nature, and bids us hunt them out and make them do our work for us. Our grandfathers might have believed that wind and water were the best possible motive powers. We may believe that steam is the best. But as they certainly would have been mistaken in their opinion, so we *may* be in ours. A cheaper, safer, and every way better motive power than steam may be among the things yet to be discoverd. It is hardly possible that better modes of applying power in aid of human labor should not be hereafter invented. That improved modes of culture will find their way into our fields is about as certain, as that the present are superior to those of the dark ages. As regards science, physics, mechanics and the application of these to useful purposes, it is about as certain that the course will be onward, as that the sun will rise and set.

The soil will produce more and more. It will produce, not without the farmer's care, watchfulness and labor, but with less of that extremely severe labor, which tends to degrade, simply because it works the body harder than is consistent with the highest mental activity. Let it not be said that labor degrades any one. Labor is honorable in spite of all the fools, who have tried to prove it otherwise. And yet, it must be confessed, that too intense labor, admitting of little or no mental exercise, keeping the man too constantly jaded down even to think clearly, to say nothing of reading, does degrade, not in the sense of making one unworthy, but of making him inferior to what he would have been with less severe labor, and inferior to others who commenced life his equals. There has always been a difficulty

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here. Many farmers have labored with unreasonable severity during the summer months. The mind, meanwhile, has been comparatively inactive. A distaste for study, consecutive thought, investigation, reading, was a natural, almost a necessary consequence; and too often the ensuing winter has passed in a sort of listless indifference to everything but the stalls and the wood pile.

At this point comes in the special value of improved implements and labor-saving machinery. They are to ease the husbandman of that too severe summer's labor. They are to prevent the mind's being borne down by an over-tasked body. They are to leave the farmer more elastic at the end of his summer's work. Verily, they are to give him some odds and ends of time for reading during the summer and that in a state not too wearied to enjoy it and to profit by it. And they are to leave him at the close of the working season, not with a dislike, but with a keen relish for books, prepared to alternate the less severe labors of winter with reading and study, something adopted not for making him a wiser farmer for next year than he may have been this, but for elevating his standing in the community, as a man and a citizen. It is for this, more than anything else, that improved implements and labor-saving machinery are to be valued. Their influence in favor of the farmer will be immense, if he rightly improves the advantages they give. The reaper and the mower, the horse hoe and the horse rake are not alone to save the wheat and the hay, and to conquer the weeds, but to give the man better opportunities and a higher position. If true to himself, he will not omit the opportunities, nor fail of a higher position, than the world has ever yet accorded to his profession.

Farmers sometimes think, and not unfrequently think aloud, that the farmer cannot learn much, that his employment is unfavorable to intellectual activity, that his perceptions are necessarily slow and his memory poor. If anything of this sort has been true of the past, it need not be of the future. Improvements already inaugurated, and those yet to be introduced, will give the farmers of the coming age an immense advantage over those of the past. That crops will hereafter be more abundant than hitherto, *in proportion to the hand labor required for their production;* or in other words, that a given amount of hand labor, in connection with the improved implements and methods, will give

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larger results, the present position of our Agriculture leaves scarcely room to doubt. And does not the prosperous condition of the country, still the cynosure of many an emigrant, still rapidly growing, afford a reasonable expectation, that prices will hereafter rule sufficiently high?

"The fools are not all dead yet," and therefore it is not to be expected that everybody will accord to the farmer the respect fairly due to his calling, even if he improves his opportunities to the best advantage. Dandies may prefer a nimbler step, and belles a softer hand than he can show; and brainless men and women may call him ignorant. He may hear from some doubtful quarter (let him never say it of himself, as too many farmers do,) that "he is nothing but a plain farmer." If he is a sensible, plain, industrious farmer, understanding his business and informed in matters of general interest, then all sensible, well informed, industrious people (and these are about all that any one need care for,) will know it; and his standing will be high in the estimation of all whose opinion is worth regarding. His profession is not as favorable for the amassing of sudden wealth as the merchant's. Perhaps the gambler oftener gets rich in a night than the farmer in a day. But it should be remembered that while one prosperous merchant is rejoicing in sudden wealth, ten that are unsuccessful are dying of a broken heart; and that whoever wins by chance or by fraud, has but a poor prospect of enjoying a peaceful life and an approving conscience. For obtaining a competency by fair means, for pursuing it without loss, for enjoying it through life, few, if any, have a better prospect than the farmer.

If progress in agriculture and in the position of the agriculturist is to be permanent, our young men, who are looking to the farm as the field of their future enterprise, *must not be educated inferiorly* to those destined to other callings. Cultivated mind is the first want; richly cultivated fields will follow as a consequence of intelligent labor; and respect and esteem, position and influence will come in their place. There is now hardly a doubt that our Legislatures, general and local will grant endowments for educating the future farmer. Whether we shall use them wisely, is less cetain; but let us try and hope for the best. That some portion of the appropriations for such a purpose should redound to the improvement of the present generation of farmers

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is desirable. Some therefore have thought, and perhaps not without reason, that lectures, with portable apparatus should be made a prominent means of communicating and diffusing knowledge on this subject; that an agricultural college should consist rather of living, acting men, than in huge piles of brick and mortar; that while the best possible facilities should be afforded at the seat of the college for all who can resort to it, a portion of the professors, or perhaps all of them for a portion of the year, should travel the State, and deliver their lectures within reach of such young men as cannot well leave their homes, and where their fathers and brothers, their mothers and sisters, might participate with them, giving the whole family, and not merely a favored son or two, "a finger in the pie." Whether anything of this kind is likely to be undertaken, and whether it will succeed others must judge.

One thing is certain—from science in its applications to the field and the farm yard, to the kitchen, the pantry and the dairy, to the shop, to the life work of the people, to the developing, strengthening, elevating of the popular mind, a bright future awaits all the industrial classes; and American agriculture will look up more and more.

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AGRICULTURAL PRODUCTIONS,

Of the State of New-York, by the Census of the State 1855, *compared with the productions of* 1845 *and* 1850, *as exhibited by the State and United States Census.*

PRODUCTIONS.	1855.	1845.	1850.	Increase from 1845.	Decrease from 1845.
1. Improved acres,	13, 657, 490½	12, 408, 968	11, 737, 567	1, 248, 522	.....
2. Unimproved acres,	13, 100, 692½	6, 710, 120*	.....	.....	.....
3. Cash value of farms,	$799, 357, 367 00	$554, 546, 642 00	.....	$224,810,725	.....
4. Value of stock,	103, 776, 053		.....	.....	.....
5. Value of tools and implements,	26, 927, 502		.....	.....	.....
6. Acres plowed, 1854,	3, 377, 471		.....	.....	.....
7. Acres in fallow, do.,	506, 030½	Not taken separately	.....	.....	.....
8 Acres in pasture, do.,	4, 984, 114½		.....	.....	.....
9. Acres in meadow, do.,	3, 384, 440½		.....	.....	.....
10. Tons of hay,	3, 256, 948½	3, 703, 000	3, 728, 797	.....	446, 052
11. Grass seeds, bush.	120, 866½	.....	184, 665	.....	.....
12. Spring wheat, acres sown,	194, 346½			.....	
13. Spring wheat, bush.	2, 033, 353	13, 391, 770†	13, 121, 498†	.....	4, 299, 268†
14. Winter wheat, acres sown,	601, 141½			.....	
15. Winter wheat, bush.	7, 059, 049½			.....	
16. Oats, acres sown,	1, 349, 384½	.....	.....	.....	.....
17. Oats, bush.	27, 015, 296	26, 323, 051	26, 552, 814	692, 245	.....
18. Rye, acres sown,	281, 714½	.....	.....	.....	.....
19. Rye, bush.	3, 039, 438	2, 966, 322	4, 148, 182	073, 116	.....
20. Barley, acres sown,	212, 608½	.....	.....	.....	.....
21. Barley, bush.	3, 563, 540	3, 108, 905	3, 585, 059	454, 835	.....
22. Buckwheat, acres sown,	293, 233½	.....	.....	.....	.....
23. Buckwheat, bush.	2, 481. 079½	3, 634, 679	3, 183, 955	.....	1, 153, 600

* The great difference in consequence of the method of taking the census. † Spring and Winter.

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AGRICULTURAL PRODUCTIONS—(CONTINUED.)

PRODUCTIONS.	1855.	1845.	1850.	Increase from 1845.	Decrease from 1845.
24. Corn, acres planted,	917, 601				
25. Corn, bush.	19, 290, 691½	14, 722, 114	17, 858, 400	4, 568, 577	
26. Potatoes, acres planted,	220, 575½				
27. Potatoes, bush.	15, 191, 852½	23, 653, 418	15, 398, 362		8, 461, 566
28. Peas, acres sown,	48, 154½				
29. Peas, bush.	705, 967½				
30. Beans, acres planted,	16, 917½				
31. Beans, bush.	244, 079	1, 922, 690*	741, 636*		972, 644*
32. Turnips, acres sown,	7, 578½				
33. Turnips, bush.	985, 522½				
34. Flax, acres sown,	11, 764				
35. Flax, lbs of lint,	4, 907, 556½	2, 897, 062	940. 577	1, 012, 494	
36. Flax, bush. seed,	87, 093½		57, 963		
37. Hemp, acres sown,	3½				
38. Hemp, tons,	½		4		
39. Hops, acres planted,	9. 481½				
40. Hops, pounds,	7, 192, 254		2, 536, 299		
41. Tobacco, acres,	786½				
42. Tobacco, lbs.	946, 502½				
43. Apples, barrels,	13, 668, 830½				
44. Cider, barrels,	273, 639				
45. Neat cattle, working oxen,	144. 597				
46. Cows,	1, 068, 427				
47. Cattle killed for beef,	225, 338				
48. Butter, lbs.	90, 293, 073½	70, 501, 733	79, 666, 094	19, 791, 340	
49. Cheese, lbs.	38, 944, 249½	36, 747. 976	49, 741, 413	2, 196, 273	
50. Milk sold, gal's.	20, 965, 861				
51. Horses,	579. 715	505, 155	447, 014	74, 560	
52. Mules,	2, 254				

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53. Swine under 6 months,	530, 176	1, 584, 344	1, 016, 252		514, 552
54. do over 6 months,	539, 616				
55. Sheep,	3, 217, 024	6, 443, 865	3, 453, 241		
56. Fleeces shorn,	2, 630, 203				126, 841
57. Wool, lbs	9, 231, 959½	13, 866, 828	10, 071, 301		4, 632, 869
58. Poultry sold, value,	$1, 076, 598 00				
59. do. value eggs,	1, 360, 673 00				
60. Cloth, dom. man. fulled, yds.	198, 203				
61. do yards flannel,	379, 922½				
62. do do linen,	105, 086				
63. do do cotton and mixed,	245, 464				

* Peas and Beans.

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AGRICULTURAL STATISTICS, 1855.

COUNTIES.	Number of persons from whom returns were received.	ACRES.		CASH VALUE			Acres ploughed the year previous.	Acres in fallow the year previous.	Acres in pasture the year previous.
		Improved.	Unimproved.	Of farm.	Of stock.	Of tools and implements.			
Albany,	3,539	242,735	70,777	$14,315,268	$1,776,960	$550,098	80,124	5,474	61,236
Allegany,	5,392	280,863	354,269	12,352,363	2,081,738	575,936	64,631	9,439	116,608
Broome,	3,925	198,839	205,208	10,872,397	1,505,679	372,625	40,526	4,926	71,556
Cattaraugus,	5,441	266,435	432,620	10,956,344	1,972,598	439,162	58,448	2,979	109,719
Cayuga,	4,299	315,795	187,237	20,700,003	2,523,234	637,307	104,976	9,184	95,149
Chautauque,	6,547	360,110	294,145	17,022,474	2,871,699	610,560	64,401	2,806	172,367
Chemung,	1,948	120,219	110,385	6,898,846	841,551	214,911	36,273	4,648	33,238
Chenango,	5,203	347,828	182.936	13,184,452	2,431,662	569,087	50,138	2,867	177,567
Clinton,	3,551	168,932	401,086	6,306,142	1,047,497	274,726	42,878	1,935	66,171
Columbia,	3,242	304,277	69,255	19,130,759	1,858,418	620,449	81.515	12,737	102,259
Cortland,	3,388	194,736	113,662	8,569,671	1,571,914	357,893	36,938	476	91,583
Delaware,	5,468	364,400	438,452	11,245,256	2,288,610	485,333	58,209	10,077	174,541
Dutchess,	3,797	366,359	98,104	27,463,045	2,880,290	704,355	82,233	5,965	156,586
Erie,	7,257	340,307	253,344	24,479,408	2,718,053	745,059	80,240	13,332	114,813
Essex,	2,715	185,443	774,195	4,604,253	970.214	179,999	34,457	1,333	82,726
Franklin,	3,247	144,627	834,964	4,998,778	1,042,006	243,335	33,494	1,019	57,424
Fulton,	2,288	133,415	147,070	5,103,631	891,427	222,645	36,230	1,529	52,546
Genesee,	3,063	219,012	75,732	16,091,998	1,675,630	442,702	35,260	46,046	43,342
Greene,	3,145	212,223	150,604	8,457,699	1,092,960	1,196,548	41,699	5,755	71,130
Hamilton,	404	16,675	766,978	757,004	80,804	24,799	2,134	140	5.976
Herkimer,	3,447	267,414	505,657	14,812,184	2,134,237	476,445	59,867	938	122,730
Jefferson,	6,992	465,222	251,291	18,718,492	2,992,793	743,410	116,129	4,337	196,434
Kings,	398	15,871	5,594	8,468,600	762,770	117,343	8.189	123	1.541
Lewis,	3,945	184,540	497,145	7,519.002	1,102,582	287,903	32,889	1,641	71,496
Livingston,	3,375	262,462	96,378	22,406,233	2,177,384	539,435	48,142	52,934	51,233
Madison,	4,680	277,393	111,505	14,353,775	2,253,862	465,057	68,442	2,610	113,463
Monroe,	4,879	216,840	78,182	29,633,614	2,824,916	818,703	88,943	40,494	62,159

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Montgomery,	2,852	194,457⅜	46,720⅜	10,309,692	1,418,034	358,598	80,955	2,534½	56,965
New-York,	48	1,050½	923½	4,324,700	1,495,212	11,395	143½	45	246½
Niagara,	3.968	207,043⅜	101,110	16,321,349	1,900,789	562.389	52,544⅞	34,221⅜	35,259
Oneida,	8,315	435,800⅜	286,594½	24,294,881	3,409,506	764,667	97,022½	2,337½	187,860½
Onondaga	6,336	344,528	114,701½	25,353,290	2,903,509	770,065	123,159⅜	7,450½	104,997½
Ontario,	3,943	290,639⅜	97,108⅜	20,882,806	2,272,115	591,755	95,987½	23,876½	79,494½
Orange,	3,982	308,599⅜	189,615	21,567,360	2,699,991	639,225	48,962½	3,452⅜	138,113
Orleans,	2,454	181,948⅜	62,326⅜	12,672,552	1,531,017	423,866	43,098	28,508	41,164½
Oswego,	6,720	244,126	328,047⅜	13,438,725	2,058,581	496,529	66,059½	3,383½	93,511⅜
Otsego,	6,109	428,932⅜	179,559½	18,318,997	2,802,602	656,876	92,717⅜	4,524⅜	196,401½
Putnam,	1,368	94,205⅜	44,447½	6,148,849	720,037	140,828	11,815½	981½	42,623½
Queens,	3,113	119,549	57,204	17,071,845	1,253,350	512,392	37,718½	4,112½	24,229½
Rensselaer,	3,869	292,212⅞	101,002⅜	16,656,695	1,935,709	540,448	78,810½	4,655	107,652
Richmond,	876	15,072⅜	7,602⅜	5,261,350	173,025	74,936	3,900⅝	842½	3,006½
Rockland,	1,221	46,481⅜	50,852⅜	4,862,210	618,059	128,330	8,844½	2,163	14,661½
St. Lawrence,	8,946	499,554	885,531	18,117,429	3,144,908	751,437	86,623½	3,981	216,985
Saratoga,	4,208	315,728½	139,849½	13,526,379	1,842,426	496,183	91,410⅜	10,683½	121,692
Schenectady,	1,328	93,448⅜	31,683½	4,910,728	596,736	195,804	37,334½	1,367	24,341½
Schoharie,	4,011	227,904⅜	132,046½	10,053,948	1,568,689	461,690	82,004⅜	7,856⅜	78,418⅜
Schuyler,	2,446	134,336½	62,999½	7,428,825	974,358	252,823	45,215½	6,381½	36,663⅞
Seneca,	2,238	151,949⅜	45,936⅜	10,498,372	1,039,547	339,647	53,838½	6,703½	30,454⅜
Steuben,	7,042	361,450	438,250⅜	17,994,630	2,406,152	680,403	103,672½	24,988⅜	102,824⅜
Suffolk,	4,338	163,818⅞	260.570⅞	13,102,827	1,271.648	344,386	35,395·	4,682⅜	56,436⅞
Sullivan,	3,683	125,489½	494,829½	5,655,321	953,211	199,497	23,607⅜	3,023½	39,934
Tioga,	3,088	154,894⅜	138,423⅜	7,593,564	1,206,835	289,054	42,810½	4,380	53,400½
Tompkins,	3,623	205,616⅜	84,963⅜	11,656,054	1,581.130	379,635	68,345½	5,782	62,692
Ulster,	4,851	240,641	378,202⅜	16,118,294	1,914,932	564,772	54,975⅜	9,571	72,863½
Warren,	2,145	111,202⅜	331,341	2,604,246	560,316	106,429	21,854	1,876	43,218⅜
Washington,	4,192	333,030½	143,554⅜	15,271,968	2,146,364	458,954	85,255½	2,284	143,078½
Wayne,	4,767	254,451⅜	102,062½	17,037,413	2,238,425	581,096	85,901	14,995⅜	64.313⅜
Westchester,	3,722	209,146⅜	81,947⅛	29,283,170	2,964,739	537,905	34,647½	4,519½	83,890⅜
Wyoming,	4,131	241,654½	122,764⅜	11,903,817	1,714,170	393,737	50,774½	17,141½	90,196½
Yates,	2,242	155,542½	51,134	9,691,390	1,098,443	305,926	44,654⅞	6,972½	40,913
Total,	231,740	13,657,490⅜	13,100,692½	$799,355,367	$103,776,053	$26,927,502	3,377,471	506,030½	4,984,114½

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AGRICULTURAL STATISTICS, 1855.—(CONTINUED).

COUNTIES.	MEADOW.			SPRING WHEAT.		WINTER WHEAT.		OATS.		RYE.	
	Acres.	Tons of hay.	Bushels of grass seed.	Acres sown.	Bushels harvested.	Acres sown.	Bushels harvested.	Acres sown.	Bushels harvested.	Acres sown.	Bushels harvested.
Albany,	64, 354¼	54, 579¼	1, 333¼	938	6, 927½	1, 586½	7, 424	43, 347¼	495, 177½	15, 037	186, 567
Allegany,	76, 273	54, 637¾	2, 117	6. 594½	56, 422½	6, 964½	82, 929	34, 845	665, 490	338½	2, 834
Broome,	58, 078½	53, 685	1, 676½	2, 153½	8, 121½	2, 852½	11, 927½	18, 901½	466, 870½	3, 690	20, 546
Cattaraugus,	75, 208½	62, 546¾	1, 812⅝	5, 395⅜	57, 278½	1, 923⅜	21, 721	31, 798⅜	697, 670½	226	2, 373½
Cayuga,	59, 604½	57, 732	2, 746⅜	2, 485⅜	27, 327	21, 940⅛	193, 729½	37, 059	956, 636	1, 594½	6, 331⅜
Chautauque,	103, 180¾	105, 672	2, 286	7, 011⅜	78, 636½	5, 366½	66, 249½	25, 782½	539, 765	200⅜	2. 808
Chemung,	24, 840	24, 941	866	2, 140	18, 624	8, 781⅛	63, 754	17, 280	473, 469	731	3, 558
Chenango,	113, 840½	117, 370¾	2, 038¼	1, 814½	20, 283½	897½	4, 560½	26, 704½	564, 242	1, 187½	14, 329
Clinton,	51, 172⅜	48, 241	1, 078	5, 550⅜	57, 172⅜	237½	2, 138½	14, 532½	276, 080½	1, 649⅜	13, 073
Columbia,	64, 305	65, 103	626½	95½	587½	4, 092	7, 972½	38, 728	543, 034	39, 864½	445, 036
Cortland,	59, 172½	56, 769½	958⅜	2, 102⅜	24, 361	579⅞	4, 696½	17, 498⅜	382, 786	351⅜	4, 172
Delaware,	122, 502½	103, 896½	1, 741⅜	1, 233	8, 538⅜	314	955⅛	34, 016½	416, 659⅛	5, 807⅜	56, 527⅛
Dutchess,	83, 100⅞	83, 878⅛	697⅛	23	250	11, 614⅜	54, 470⅛	37, 586	626, 347	20, 424⅞	239, 063
Erie,	93, 053⅛	98, 011⅛	3, 720¼	4, 505⅜	46, 913	16, 907⅜	238, 812⅜	35, 983	724, 747⅛	1, 822⅛	24, 979⅛
Essex,	56, 829⅜	39, 139⅛	1, 019¼	4, 838⅜	44, 009¼	315	2, 484	14, 334⅛	234, 946	1, 631¼	13, 357½
Franklin,	45, 906⅜	37, 594⅛	662¼	6, 958⅜	69, 559⅛	175½	1, 353⅜	9, 411⅜	144, 617	2, 235	20, 191⅛
Fulton,	34, 070⅜	33, 903	5, 192⅛	734¼	7, 500⅛	415	3, 644⅛	17, 367¼	355, 855	1, 707⅜	22, 383¼
Genesee,	31, 135⅜	41, 398⅜	1, 766¼	850⅛	11, 154	41, 194⅛	760, 461	10. 972¼	299, 809	99⅛	1, 149
Greene,	71, 395⅜	58, 524½	355½	607⅜	3, 175½	2, 297⅜	7, 346	16, 319½	160, 907⅛	10, 144½	72, 232
Hamilton,	6, 297¾	4, 274	114⅛	76½	245	1	6	1, 187⅜	16, 701	32½	277
Herkimer,	74, 097	78, 254⅜	1, 943	2, 774⅛	38, 149	581½	5, 904⅛	30, 763	724, 585	1, 085⅜	17, 550
Jefferson,	122, 491	98, 575	13, 601½	29, 687½	428, 672⅜	6, 303½	70. 509⅛	38, 375½	456, 230⅛	7, 775½	99. 391⅛
Kings,	3, 863	6, 183	6	.....	.....	887	18, 086	418	11, 679	254	4, 860
Lewis,	57, 238½	51, 802	1, 746⅛	4, 603½	59, 940	317⅜	3, 845¼	14, 037½	295, 445½	1, 151½	11, 383⅛
Livingston,	34, 680	39, 187⅜	1, 657½	1, 922½	18, 025	63, 662½	1, 094, 779	11, 909⅜	261, 990	397½	4, 118
Madison,	70, 545⅜	68, 263½	1, 155⅜	4, 344⅜	52, 777	4, 459⅛	29, 320⅛	25, 977½	571, 637	84½	1, 477
Monroe,	45, 681	58, 738⅛	1, 886½	182⅜	2, 620	59, 138⅜	810, 363	26, 025½	792, 370	652	9, 166⅛

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Montgomery, ...	41, 507⅔	44, 532½	4, 707½	1, 898	18, 978½	3, 114	23, 904½	44, 487½	997, 605	2, 770	39, 112½
New-York, ...	101	157	.....	.....	.....	2	30	19	435	2	25
Niagara, ...	32, 520⅔	41, 117½	2, 678⅔	352½	5, 386	45, 788½	589, 911	12. 483	353, 398	61¼	1, 014
Oneida, ...	119, 745⅔	124. 933½	8, 700½	3, 396⅔	41, 883¼	3. 177⅓	20, 439½	39, 169⅓	975, 800¼	2, 021½	24, 121
Onondaga, ...	63, 193⅔	63, 246⅔	3, 493¼	7, 197½	85, 148	19, 601⅔	97, 058½	41, 509⅙	1 015, 227½	440⅔	5, 340½
Ontario, ...	45, 094½	42, 448⅔	2, 133	3, 177½	27, 659	38, 680½	528, 488	22, 049½	525, 937½	1, 149½	16, 002
Orange, ...	83, 771	103, 211¼	1, 111	8½	32	7, 076½	43, 363	15, 242½	291, 111	17, 860½	202, 301
Orleans, ...	25, 150½	34. 620¼	1, 524	192	2. 206	31, 830⅔	376, 949	14, 656⅙	229, 731	150⅔	2, 777
Oswego, ...	63, 501½	58, 138	1, 454	3, 914½	44, 300⅞	1, 544½	12, 596	22, 674½	535, 432½	3, 733½	45, 557½
Otsego, ...	115, 979⅔	108, 069⅔	3, 341⅔	4, 803⅝	53, 446¼	1. 231¼	5, 678	49, 016¼	903, 647	3, 031⅔	34, 218¼
Putnam, ...	26, 191⅔	27. 756⅔	50½	.....	.....	507½	3, 550⅔	3, 714½	66, 922	2, 112¼	22, 890½
Queens, ...	37, 634¼	51, 395	624½	4	48	6, 877½	102, 169¼	9, 426¼	199, 518	6, 136½	71, 019
Rensselaer, ...	68, 361¼	58, 557⅔	435	1, 256⅔	13, 383½	692½	2. 658	29, 295⅔	558, 377	22, 630½	299, 864
Richmond, ...	4, 528½	7, 032	79½	26	575	792½	11, 335⅔	741½	15, 991½	204⅔	3, 131½
Rockland, ...	12, 984	14, 828	50½	2½	6	376	2, 945⅔	1, 963	28, 168	5, 323⅔	31, 600½
St. Lawrence, ...	163, 623	139, 400	3, 220½	32, 623	295, 464	3, 991½	24, 780½	28, 866½	437, 041	2, 741½	25, 725
Saratoga, ...	60, 602½	52, 743⅔	1, 514½	890½	8, 074	3, 397⅔	14, 826½	35, 590½	744, 220	13, 317½	132, 774⅔
Schenectady, ...	18, 566½	16. 185½	808½	815½	6, 377⅔	673⅔	5, 165½	15, 809½	293, 768	3, 899½	44, 752½
Schoharie, ...	56, 386½	48. 774⅔	4, 557½	2, 968½	23, 074⅔	4, 997⅔	18, 645	37, 784	490, 063½	7, 843⅔	87, 592⅔
Schuyler, ...	25, 141½	17, 996½	1, 392⅔	5, 612⅔	33, 139½	11, 803	80, 431⅔	17, 122	357, 247	694½	6, 168
Seneca, ...	24. 660	20, 879⅔	5, 098⅔	1, 229½	11, 379	14, 912⅔	151, 721	21, 429⅔	556, 238	670⅔	7, 862
Steuben, ...	76, 401½	58, 749½	1, 925½	10, 821½	82, 014	33, 768	219, 590	51, 169⅔	711, 307	1, 130½	10, 212
Suffolk, ...	35, 555½	41. 505⅔	1, 741½	16	129½	9, 973½	151, 520½	10, 317½	262, 067½	5, 285½	52, 212½
Sullivan, ...	41, 803⅔	40, 716½	1. 972⅔	9⅝	98	333	1, 472½	7, 004	109, 883	7, 560½	75, 153
Tioga, ...	38, 036⅔	38, 401⅔	2. 452⅔	1, 339½	11, 938½	4, 351½	19, 355	19, 493½	452, 978	2, 668½	25, 884½
Tompkins, ...	39, 493	31, 843⅔	2, 091½	3, 182½	32, 642⅔	11, 040	84, 395½	34, 142½	812, 983	1, 719½	17. 521
Ulster, ...	65, 672⅔	64, 795	1, 201⅔	19½	815	4, 390	19, 370⅔	18, 473½	278, 105	27, 094½	235, 993½
Warren, ...	31, 134	22. 088⅔	398½	540⅞	4. 285	221½	1, 212	7, 564½	120, 347	1, 476½	10, 952⅔
Washington, ...	78, 148⅔	69, 881	1, 429	2, 034½	23, 854	1, 968	8, 387	31, 111	798, 321	9, 908⅔	121, 967
Wayne, ...	39, 165⅗	45, 271½	2, 126	263⅜	2, 687	29, 214½	282, 474⅔	29, 100⅛	875. 624½	574⅔	7, 259½
Westchester, ...	64. 309½	90. 496⅔	1, 761⅔	183	1, 497	4, 222	33, 751½	10. 943½	204, 759	4, 968½	51, 404
Wyoming, ...	59. 184	58, 421½	1, 536⅔	3, 299⅔	37. 497⅛	19. 198½	382. 498⅔	24. 377⅔	496, 837	211⅔	2, 777⅛
Yates, ...	23, 372⅜	15, 850½	449½	2, 624	18. 063	17, 587	168, 969⅔	11. 479½	160. 457⅔	2. 146½	24. 517
Total, ...	3. 384, 440⅔	3. 256, 948½	120, 866⅔	194, 346½	2, 033. 353	601. 141½	7, 059, 049¼	1, 349, 384½	27, 015, 296	281, 714⅞	3. 039, 438

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AGRICULTURAL STATISTICS, 1855.—(CONTINUED.)

COUNTIES.	BARLEY.		BUCKWHEAT.		CORN.		POTATOES	
	Acres sown.	Bushels harvested.	Acres sown	Bushels harvested.	Acres planted	Bushels harvested.	Acres sown.	Bushels harvested.
Albany,	997	9,126	14,722	84,812	12,612	193,691	6,884	375,654
Allegany,	2,102	28,454	4,956	39,298	6,800	189,588	3,057	206,258
Broome,	214	2,337	6,932	73,214	8,101	214,998	2,388	160,420
Cattaraugus,	942	14,095	2,320	26,183	10,271	309,762	2,597	300,245
Cayuga,	16,275	308,303	4,920	54,076	30,519	868,543	3,201	251,718
Chautauque,	1,224	19,656	1,055	9,664	19,761	558,507	3,723	282,451
Chemung,	1,100	23,862	5,902	69,046	7,199	239,285	1,190	131,291
Chenango,	1,138	22,229	4,238	50,304	10,745	354,480	3,179	270,542
Clinton,	439	6,877	4,606	30,651	6,132	92,567	5,874	385,492
Columbia,	251	3,801	7,899	54,334	26,439	383,339	6,199	259,419
Cortland,	2,402	45,665	2,623	28,115	7,501	240,703	1,857	155,389
Delaware,	173	2,219	11,970	86,330	5,543	119,383	3,869	209,567
Dutchess,	184	2,818	5,265	43,124	33,008	558,308	3,693	205,498
Erie,	3,661	57,256	2,455	24,558	18,627	483,228	7,452	445,350
Essex,	86	1,118	2,431	13,701	5,866	105,369	4,286	318,021
Franklin,	693	6,188	1,705	13,625	4,850	83,615	5,709	484,425
Fulton,	931	14,704	5,522	69,759	7,013	155,733	2,284	182,964
Genesee,	3,049	59,819	1,829	14,913	16,286	437,052	2,383	167,274
Greene,	271	1,787	10,021	33,913	9,819	99,204	3,076	116,871
Hamilton,	14	42	459	2,913	435	7,151	406	25,257
Herkimer,	2,709	51,439	3,505	42,875	9,782	283,748	3,108	257,875
Jefferson,	28,262	392,684	965	5,909	18,486	321,779	5,154	289,031
Kings,	.....	.....	21	235	1,948	54,179	3,089	368,243
Lewis,	1,992	37,513	1,067	10,443	4,616	92,398	3,295	243,841
Livingston,	6,977	123,255	1,814	13,836	15,172	431,464	1,858	132,256
Madison,	10,456	197,231	1,396	13,853	14,920	449,583	2,943	224,278
Monroe,	7,576	179,755	3,569	22,623	30,409	805,811	7,728	654,551
Montgomery,	2,330	39,252	12,797	141,677	10,494	247,516	1,945	145,154

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New-York,	.....	.....	.....	.....	31	1, 180	28	1, 808
Niagara,	3, 781⅜	79, 593	2, 622	29, 151½	17, 296⅞	509, 505	3, 266⅞	275, 448
Oneida,	7, 185⅜	137, 430	4, 355½	54, 767⅜	26, 573½	732, 294½	7, 678¼	624, 648
Onondaga,	20, 755¼	371, 785½	3, 198⅜	32, 453⅜	32, 246⅞	907, 453	4, 890½	380, 141⅛
Ontario,	18, 640	320, 375	3, 093	18, 325¾	24, 148	617, 485¼	2, 563⅜	188, 900
Orange,	15¼	179	4, 647	23, 023¾	19, 961⅛	357, 490⅛	3. 789½	123, 551½
Orleans,	1, 659¼	36, 071	2, 386⅞	12, 903	118, 356¼	436, 975	2, 111⅜	171, 867
Oswego,	1, 504⅜	28, 054	3, 783¼	31, 605⅜	20, 919⅜	503, 812	5, 584⅛	391, 912¼
Otsego,	2, 820⅜	43, 889	9, 903⅛	112, 732⅜	12, 395	340, 170½	5, 026¼	412, 703⅛
Putnam,	.....	.....	1, 891¼	10, 718¼	4, 434¼	119, 919⅛	1, 198¾	64, 504
Queens,	180	2, 769	6, 299	21, 224½	13, 852¾	337, 685	4, 089⅞	291, 135
Rensselaer,	629¼	12, 807	5, 832½	52, 821	20, 532¾	393, 413⅛	8, 317¼	596, 559
Richmond,	26⅛	627	79¼	1, 325	1, 555⅛	43, 037½	315½	21, 739
Rockland,	3⅛	14	1, 917	8, 722¼	3, 458⅛	51, 873	1, 223	47, 223⅛
St. Lawrence,	1, 713¾	28, 187	1, 758	12, 912½	12, 755	220, 593	9, 172	604, 023
Saratoga,	658½	9, 524	11, 588⅛	108, 882⅛	28, 849⅜	479, 449	7, 745½	487, 672
Schenectady,	365⅛	5, 569½	5, 983½	41, 858	5, 690⅞	92, 279	1, 884	105, 132
Schoharie,	3, 572½	44, 136	16, 799½	169, 078	7, 187½	161, 153½	3, 164⅜	190, 432⅛
Schuyler,	5, 063¼	60, 507	7, 242¼	67, 523	6, 775	160, 780½	1, 259	81, 106
Seneca,	6, 280½	104, 856	3, 550¼	21, 436½	16, 239¾	387, 998½	1, 091⅜	72, 544
Steuben,	8, 429¼	78, 873	13, 054¾	89, 990½	12, 796¾	292, 689⅛	4, 007	255, 938
Suffolk,	512¼	10, 974	3, 085⅛	18, 856½	17, 615½	504, 767	3, 403¼	304, 063
Sullivan,	47½	1, 053⅛	6, 403¼	65, 571⅛	4, 409½	102, 594	1, 759¼	103, 188⅜
Tioga,	377¼	5, 925	7, 006⅜	91, 402½	7, 839¼	260, 074	1, 843⅜	150, 518½
Tompkins,	3, 753¼	65, 295	9, 296⅜	74, 305	14, 737¾	372, 202	1, 554⅛	111, 106
Ulster,	10	130	9, 375¾	70, 676	18, 429⅜	242, 229⅛	3, 440½	134, 539⅛
Warren,	4½	39	2, 910⅜	19, 214¾	7, 268½	123, 817	2, 630½	173, 328
Washington,	760¼	12, 944½	4, 543½	40, 658½	25, 781	589, 678⅛	11, 780⅞	767, 285
Wayne,	10, 498¼	229, 495	4, 220½	39, 766¼	29. 473⅜	756, 677¼	3, 452⅞	261, 403
Westchester,	130	545	2, 846½	20, 890⅜	12, 838⅜	402, 238⅛	4, 759⅜	286, 249
Wyoming,	4, 289¼	68, 267	2, 150½	20, 277⅛	8, 681	234, 006	3, 086¼	203, 932
Yates,	12, 485½	152, 134	4, 434¼	24, 007¼	11, 103⅜	174, 181	1, 018⅜	57, 912½
Total,	212, 608½	3, 563, 540	293, 233¼	2, 481, 079¼	917, 601	19, 290, 691½	220, 575¼	15, 191, 852½

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AGRICULTURAL STATISTICS, 1855.—(CONTINUED.)

COUNTIES.	PEAS.		BEANS.		TURNIPS.		FLAX.		
	Acres sown.	Bushels harvested	Acres planted.	Bushels harvested.	Acres sown.	Bushels harvested.	Acres sown.	Pounds of lint.	Bushels of seed.
Albany,	1,845	15,989½	339¾	2,306	104⅜	14,696	52½	2,675	210¼
Allegany,	1,687½	22,844½	182	3,174⅜	126⅛	22,075	34⅜	879	205¼
Broome,	57½	932½	92⅜	949⅞	92¼	12,375	8	478	35½
Cattaraugus,	938½	14,492¼	242¼	4,496½	142½	26,104	8⅜	2,738	58⅜
Cayuga,	435⅜	6,565	359⅛	5,638½	76⅜	17,464½	138⅜	18,385	1,166
Chautauque,	536¼	7.693	208½	4,038	93⅜	20,360	42½	4,584	302½
Chemung,	89½	1,360½	56½	1,859¼	26⅜	3,964	6	130	66½
Chenango,	236½	4,018½	102⅜	2.763¼	61¼	9,732	36⅜	16,636	203½
Clinton,	1,313⅛	14,545	597⅜	6,993½	52⅜	5,314	36¼	7,700	236½
Columbia,	138⅞	1,336⅜	69¼	739	67	6,545½	19	1,128	54⅜
Cortland,	505⅜	9.527	96⅜	1,726½	63⅞	11,724	237⅜	58,269	2,173⅜
Delaware,	234⅜	2,229½	50⅞	2,128½	129⅜	19,612	10⅜	1,477	25¼
Dutchess,	25	670	37¼	788¼	946⅜	58,577	11½	557	15
Erie,	929⅛	15.321½	349¾	6,124	154⅜	20,987	34⅜	5,026	276½
Essex,	1,088½	11,625½	284	2,818	64	9,128	2⅜	195	6½
Franklin,	1,004⅜	12,074½	174⅜	1,839¼	67	13,092	2½	704	6½
Fulton,	774½	14,202	39⅜	761½	38½	4,213	143½	223,005	1,215½
Genesee,	621⅜	8,797½	635½	8,569½	41⅜	6,646	57⅛	118,500	595½
Greene,	239⅜	1,532¼	135⅜	693½	81½	6,732½	5⅛	10,620	14⅜
Hamilton,	14	140	5½	154½	14½	1,589	1	6,000	.....
Herkimer,	1,586⅞	27,864	83½	1.616	27⅜	2,579	312⅜	308,050	4,241
Jefferson,	4,536½	63,338	389½	4,281½	40⅞	4,112½	64⅛	12,066	760¾
Kings,	174½	16,930	66	7,042	212½	31,001	.....	.....	.....
Lewis,	856½	12,978½	72⅜	1,030½	55⅞	5,830½	219	65,782	1,566
Livingston,	528½	6,398½	81⅜	1,003½	23⅞	3,510	2½	90	13⅜
Madison,	1,147	20,973½	276⅜	4,836½	28½	2,948	92½	102,581	735½
Monroe,	992⅜	16,028½	1,427½	14,342⅜	195	32,507	8½	1,000	56½
Montgomery,	1,367½	22,855½	228⅜	3,941	8	1,441½	1.132	1,016,929	7,746⅜

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New-York,	3¼	250	6½	645	27¼	2,060	.....	.....	.....
Niagara,	913½	15,981	774⅛	9,256½	138½	28,958	86⅞	380	322
Oneida,	712	12,912½	472½	7,770⅛	155⅛	25,005	140⅛	6,635	1,233½
Onondaga,	2,324⅞	34,915½	517	8,984	120½	19,175⅛	319½	57,287	2,644⅛
Ontario,	1,449⅛	15,297½	201⅛	2,404⅛	39⅛	5,743½	41½	2,070	199½
Orange,	9⅛	230	27⅞	348¼	105	11,569	½	30	.....
Orleans,	411	5,471	3,918½	40,185⅛	72⅛	11,467	40½	19,030	285
Oswego,	719½	11,116½	280⅛	4,326	142⅞	27,252	103½	37,109	749
Otsego,	1,824½	29,935⅞	119⅛	2,811½	69⅛	19,091	386⅛	98,504⅛	1,424½
Putnam,	3	48	19⅛	210½	102½	8,488	.....	.....	.....
Queens,	383½	33,444	203	22,282½	562⅛	84,544	½	300	1
Rensselaer,	108⅛	1,574	425⅛	5,979	87½	11,982	2,400	672,780	19,266⅛
Richmond,	7	410	1½	166¼	39¼	4,481	.....	.....	.....
Rockland,	2	49	5⅞	63	64½	10,792	.....	.....	.....
St. Lawrence,	5,234½	69,016	475½	5,131	71⅛	7,896	3	1,206½	4
Saratoga,	331⅛	6,466	112½	972⅞	120½	12,809	62½	15,125	515⅛
Schenectady,	389½	5,551½	87	714⅛	26½	4,149	403½	260,200	2,346
Schoharie,	2,888⅛	33,482½	172⅞	1,656½	51⅞	8,427	73½	13,916	526¼
Schuyler,	129⅞	1,710½	176½	1,931	31⅛	5,734	73⅛	8,058	420¼
Seneca,	51⅝	640½	60⅛	573½	27	4,645	988½	529,811	7,035
Steuben,	2,646½	25,006½	245½	2,686½	202⅞	22,545	108⅛	1,777	306
Suffolk,	2	142	55⅞	1,382½	563½	104,183½	.....	.....	.....
Sullivan,	7½	168½	31½	698½	129⅛	20,402	⅛	92	2⅛
Tioga,	314⅛	3,992½	127½	2,495½	45½	7,352	18½	712	140½
Tompkins,	312⅛	4,659½	184⅛	2,100½	27½	5,133	209½	79,932	1,706
Ulster,	20⅛	296½	53⅛	534	514½	24,136½	117½	2,107	78
Warren,	220½	2,270½	94⅛	915½	69½	10,205	.....	.....	.....
Washington,	1,227⅛	14,210½	444⅛	5,075½	50⅞	7,518	2,858⅞	839,420	23,003
Wayne,	472½	8,455½	403⅛	5,866⅛	122½	24,699	57⅛	23,260	527½
Westchester,	3⅛	230	12	278½	620⅛	60,993	.....	.....	.....
Wyoming,	933½	13,326½	429½	8,232½	113½	7,727	70	6,630	518½
Yates,	191⅝	1,444	91½	745⅛	25⅞	1,500	482½	245,000	1,850
Total,	48,154⅛	705,967⅛	16,917⅛	244,079	7,578½	985,522½	11,764	4,907,556⅛	87,093½

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AGRICULTURAL STATISTICS, 1855.—(CONTINUED.)

COUNTIES.	HEMP.		HOPS.		TOBACCO.		APPLE ORCHARDS.		MARKET GARDENS.	
	Acres sown.	Tons of hemp.	Acres planted.	Pounds harvested.	Acres planted.	Pounds harvested	Bushels of apples	Barrels of cider.	Acres cultivated.	Value of products.
Albany,	.....	.....	12	7,440	1	.....	234,251	6,038	1,112½	$97,461
Allegany,	.....	.....	7½	2,768	⅛	128½	214.136	2,983	24	2,030
Broome,	.....	.....	35¼	21,808	17⅞	23,650	224,463	4,747½	33¼	1,340
Cattaraugus,	.....	.....	2⅜	488	1⅜	1,770	177,173½	1,257	7⅞	463
Cayuga,	.....	.....	5½	2,640	2¼	3,300	522,751	10,362½	48½	10,245
Chautauque,	.....	.....	5½	2,416	1⅜	1.390	368,115	4,524⅛	57½	5,485
Chemung,	.....	.....	.....	102	28½	33,597	107,364	2,961	25½	4,948
Chenango,	.....	.....	220	163,332	⅜	550	553,554	7,559½	1	57
Clinton,	.....	.....	2	1,014	.....	20	76,936½	852½	2⅞	408
Columbia,	.....	.....	.....	.....	⅜	418	210,342	9,480	98⅜	5,738
Cortland,	.....	.....	11½	2.037	.....	40	351,975	3,738	2⅞	397
Delaware,	1	¼	187½	69,028½	.....	.....	259,160	5.918½	3,645	69
Dutchess,	.....	.....	4	3,104	12⅜	18,507	216,593	8,247⅜	158⅜	12.777
Erie,	.....	.....	4	2,862	.....	50	266,195	6,084⅜	481½	39,130
Essex,	.....	.....	5	9	.....	.....	64,200½	909½	½	126
Franklin,	.....	.....	418½	231,217	⅛	153	26,273	377½	5⅜	583
Fulton,	.....	.....	23	.....	.....	.....	100,142	2,670½	¼	705
Genesee,	.....	.....	21	12,007	4⅛	4,130	296,121	5,767	13	641
Greene,	.....	.....	9½	26	⅛	75	192,814½	3,954½	56½	4,174
Hamilton,	.....	.....	.....	.....	.....	.....	3,459	18	.....	10
Herkimer,	.....	.....	594⅜	510,033	.....	115	333,901	6,446	9	1,133
Jefferson,	.....	.....	37⅛	28,995	¼	3,691	215,431	3,459½	53½	12,790
Kings,	.....	.....	.....	.....	.....	.....	54	.....	1,414½	273,552
Lewis,	.....	.....	25	8,870	.....	.....	72,198	1,451	1⅛	115
Livingston,	.....	.....	10⅛	14.255	.....	10	242,200	5,928⅛	27¼	1,134
Madison,	.....	.....	1,490¼	1,312,308	9⅛	13,680	531,677	7,417⅛	20¼	1,810
Monroe,	.....	.....	51	44,010	77⅛	86,520	491,491	10,312	245⅛	26,540
Montgomery	2	.....	453⅛	241,603	⅜	249	155,861	5,608⅛	23¼	2,130

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New-York,	.....	.....	.....	.....	.....	.....	.....	.....	157	66,000
Niagara,	.....	.....	.....	.....	10⅞	13,010	255,997	4,461½	51⅛	9,431
Oneida,	.....	.....	675⅛	616,054	33⅞	39,220	634,262	12,735	246⅜	49,258
Onondaga,	.....	.....	17¼	13,427	471⅛	554,987	624,545⅛	13,725¼	274⅛	19,243
Ontario,	.....	.....	42⅜	32,751	10⅛	9,180	397,098	8,044	67⅞	6,555
Orange,	.....	.....	.....	39	1¼	800	80,180½	3,188	67⅛	7,922
Orleans,	.....	.....	⅛	16	17⅛	22,871	281,781½	4,534	6½	814
Oswego,	.....	.....	45½	29,206	.....	15	425,915	8,105⅛	93¼	11,232
Otsego,	.....	.....	4,132⅞	3,122,258½	½	543	601,196	8,880	10¼	439
Putnam,	.....	.....	.....	20	.....	.....	27,158	814⅛	21⅛	1,466
Queens,	.....	.....	.....	25	.....	.....	3,346	29	3,186⅛	337,503
Rensselaer,	.....	.....	3	1,615	.....	.....	131,241	4,364	374½	34,665
Richmond,	.....	.....	.....	.....	.....	.....	28	.....	162¼	16,740
Rockland,	.....	.....	.....	3	.....	.....	3,253	47	22½	2,665
St. Lawrence,	.....	.....	259⅛	197,875	.....	.....	90,497	719	31¼	4,730
Saratoga,	.....	.....	18⅛	18,364	½	200	289,478	11,386½	248	13,184
Schenectady,	.....	.....	14	2,600	¼	150	105,551	2,848⅛	122	8,105
Schoharie,	⅛	.....	525⅛	440,754	.....	15	222,182	3,689½	⅛	120
Schuyler,	.....	.....	1⅛	730	⅛	30	143,229	3,212	5½	465
Seneca,	.....	.....	.....	.....	8⅛	16,500	175,278	4,629	36⅛	1,425
Steuben,	.....	.....	13	8,649	10⅞	16,950	297,289	4,580	101⅛	3,649
Suffolk,	.....	.....	1⅛	304	⅛	1,000	27,799	427⅛	25⅛	3,293
Sullivan,	.....	.....	1	176	¼	52	73,298	1,699¼	3⅜	278
Tioga,	.....	.....	2⅛	1,200	⅛	160	169,183	4,359	2⅜	325
Tompkins,	.....	.....	1⅛	1,138	21⅛	27,090	417,757	6,172	10	217
Ulster,	.....	.....	62¼	2,735	2	2,524	397,754	5,606⅛	95	7,114
Warren,	.....	.....	.....	7	⅛	20	58,772⅛	1,002	2¼	85
Washington,	.....	.....	¼	62	.....	2,390	189,103	5,809⅛	22	2,110
Wayne,	.....	.....	6⅛	737	28⅛	38,432	509,626	8,893⅛	49⅛	4,198
Westchester,	.....	.....	.....	5	3¼	2,202	60,137⅛	2,325¼	511⅛	18,454
Wyoming,	⅛	.....	17⅛	17,526	⅛	115	323,290	4,517⅛	3	237
Yates,	.....	.....	4	1,605	6	6,003	143,773	3,760⅛	6	769
Total,	3⅜	⅛	9,481¼	7,192,254	786⅛	946,502⅛	13,668,830⅛	273,639	12,590⅞	$1,138,682

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AGRICULTURAL STATISTICS, 1855.—(CONTINUED.)

COUNTIES.	Pounds of maple sugar made.	Gallons of maple molasses made.	Gallons of wine made.	Pounds of honey collected.	Pounds of wax collected.	SILK.	NEAT CATTLE.		
						Pounds of cocoons.	Total number.	Under one year old	Over 1 year, exclusive of work'g oxen and cows.
Albany,	4,809	358	238	53,650	3,436½	12	23,247	3,184	4,918
Allegany,	332,260	3,490	103	68,998	3,321½	.....	47,332	7,913	17,018
Broome,	52,308	937½	104	47,380	2,113½	18	37,544	6,210	10,687
Cattaraugus,	416,300½	2,459	23	62,486	3,378	.....	58,489	10,417	20,202
Cayuga,	40,036	1,434½	202	83,553½	4,165½	.....	46,178	7,810	16,040
Chautauque,	420,722	3,916½	624½	53,465	4,142	.....	76,890	12,851	23,478
Chemung,	6,482	363	32	39,191	1,670½	.....	20,899	3,496	6,203
Chenango,	272,528	2,835	32	48,702	3,451	.....	68,391	10,162	17,403
Clinton,	56,277	939½	47	51,459	2,238½	.....	25,555	4,411	8,376
Columbia,	2,779	243	725	31,618	1,466	4	27,676	3,817	5,658
Cortland,	258,977	2,769½	81	56,148	3,619½	.....	37,671	5,304	8,990
Delaware,	313,302	5,701	133½	101,571	5,285¼	.....	65,181	10,978	14,939
Dutchess,	1,697	159½	35	38,503	1,830	2	44,126	4,349	8,930
Erie,	129,627	1,896¼	173	59,659	3,220	.....	55,439	7,624	14,190
Essex,	29 844	399	9	27,342	1,419	.....	23,567	3,998	8,739
Franklin,	125,005½	606½	8	19,622	919	.....	23,677	3,474	7,425
Fulton,	18,831	820½	226	23,761	1,300	.....	19,922	3,081	5,400
Genesee,	80,056	1,747	265½	32,359	1,568	.....	24,785	4,298	8,529
Greene,	48,895	1,550	20¼	32,940	2,202¼	.....	25,239	3,858	6,440
Hamilton,	9,507	298	.....	5,610	401½	.....	2,456	488	756
Herkimer,	73,328	3,643	145	38,347	2,927½	.....	49,820	5,046	7,336
Jefferson,	366,449	4,652	400	18,444	1,290½	.....	79,249	10,271	16,984
Kings,	.....	.....	35	.....	.....	.....	3,204	160	169
Lewis,	236,918	4,698½	45	11,912	831	.....	29,748	2,683	5,491
Livingston,	13,488	539	1,563	26,693	1,950½	5	29,383	4,696	11,956
Madison,	66,314½	2,537	208	55,615	3,366¾	10	44,924	5,906	13,077
Monroe,	15,344	746½	689	46,038	1,842¾	.....	39,545	7,156	12,881
Montgomery,	14,178	1,037	408	58,571	3,544	.....	30,502	4,796	7,850

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New-York,	.....	.....	.....	.....	.....	.....	3,323	4	2,600
Niagara,	3,781	249	160	27,205	1,460	.....	28,238	5,038	9,434
Oneida,	60,765¾	3,615	303½	138,475	3,455½	.....	77,832	4,560	17,002
Onondaga,	44,828	2,050¼	1,583	81,575	3,857¾	.....	50,228	7,644	15,329
Ontario,	54,474½	2,542½	959½	53,135	2,458¾	2	33,962	5,859	11,788
Orange,	2,346½	140½	2,173	25,111	2,128¼	.....	57,602	4,929	8,997
Orleans,	17,609	422	139	23,113	1,151½	.....	23,412	4,782	8,545
Oswego,	59,542	1,081	79	47,700	2,142¼	.....	42,172	5,933	11,163
Otsego,	193,206	4,099	43	93,020	4,665¾	.....	63,798	8,711	17,432
Putnam,	1,226	142	5	13,237½	459	.....	15,507	1,748	2,708
Queens,	1,771	.....	.....	5,989	276	.....	14,326	1,437	1,723
Rensselaer,	17,955	400¼	802	33,684½	1,840½	12	29,601	3,474	6,559
Richmond,	.....	.....	64	475	22	.....	2,250	302	359
Rockland,	5	.....	497	8,667	174½	.....	7,198	601	1,316
St. Lawrence,	513,913	3,070	59	51,614	2,814½	.....	96,408	12,403	26,268
Saratoga,	4,399	126	733½	45,202½	2,499	.....	34,769	5,562	9,804
Schenectady,	207	30	99	12,688	782½	.....	8,614	1,387	2,862
Schoharie,	47,819	2,339	210	89,676	4,496½	16	38,771	6,971	11,147
Schuyler,	9,447	358½	57½	52,167	2,076	4	19,004	3,783	6,417
Seneca,	2,241	311	550	37,549	1,609½	.....	16,996	3,611	5,672
Steuben,	112,287	3,664½	187	113,653	5,429½	36	52,483	9,915	17,933
Suffolk,	.....	.....	18	6,087	414	.....	24,215	4,322	7,054
Sullivan,	12,550	715½	105	40,946	2,398½	8	27,346	4,707	7,599
Tioga,	25,725	729	75	38,378	1,612½	.....	29,664	5,297	9,090
Tompkins,	39,853	1,676	971½	83,627	4,075¾	37½	30,847	5,140	9,469
Ulster,	37,854½	1,502¼	121½	49,898	3,125	26	34,140	4,763	7,374
Warren,	18,615	641	88	20,062	1,061½	.....	14,282	2,269	4,429
Washington,	5,258	548	116½	30,000	1,945	.....	40,410	7,547	12,074
Wayne,	13,863	1,280	680½	58,204	2,820½	70	38,464	7,133	12,800
Westchester,	1,410	.....	240	17,592	6,370¼	5	33,132	3,475	4,172
Wyoming,	209,046	1,808	127	36,248	2,000	.....	39,048	6,351	13,286
Yates,	17,556	775	360	29,260	1,510½	.....	16,784	3,379	5,408
Total,	4,935,815½	85,091½	18,181½	2,557,876	138,033½	267½	2,105,465	311,474	577,887

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AGRICULTURAL STATISTICS, 1855.—(CONTINUED.)

COUNTIES.	NEAT CATTLE.		Number of cattle killed for beef.	Pounds of butter.	Pounds of cheese.	Gallons of milk sold.	Number of horses.	Number of mules.	SWINE.	
	Working oxen.	Cows.							Under six months	Over six months.
Albany,	1,813	13,332	11,466	1,173,527	36,520	502,994	10,954	31	13,809	10,226
Allegany,	3,392	19,009	2,550	1,700,775	1,044,978	10,803	11,223	36	4,963	8,185
Broome,	3,531	17,116	1,619	1,753,417	40,896	89,122	5,998	7	5,821	6,330
Cattaraugus,	4,137	23,633	2,170	1,957,183	1,717,484	6,200	9,497	11	5,376	8,458
Cayuga,	2,506	19,822	3,093	2,082,022	199,333	84,344	15,405	4	14,187	14,894
Chautauque,	4,515	36,046	3,830	3,389,837	1,198,361	56,358	13,047	15	9,156	11,949
Chemung,	1,510	9,690	1,938	924,645	7,861	52,820	4,856	6	4,097	5,756
Chenango,	3,887	36,939	2,176	3,990,564	1,212,544	2,122	10,971	10	9,094	8,998
Clinton,	1,484	11,284	2,385	891,431½	105,906	3,402	8,444	36	2,875	4,993
Columbia,	3,701	14,500	2,325	1,347,428	67,167	492,203	9,103	211	22,194	10,374
Cortland,	1,709	21,668	1,860	2,379,257	708,679	13,133	7,410	27	6,000	6,302
Delaware,	4,780	34,484	2,044	4,026,575	61,185	5,010	9,140	5	7,221	8,640
Dutchess,	6,263	24,584	4,259	1,681,595	54,119	1,970,368	10 829	29	29,074	13,912
Erie,	3,794	29,831	5,320	1,866,132	2,038,392	1,173,085	16,983	10	7,342	17,440
Essex,	2,081	8,749	1,736	625,542	93,594	1,845	6,149	43	2,775	3,729
Franklin,	1,859	10,919	1,305	1,050,040	143,916	6,300	6,029	3	2,820	4,715
Fulton,	1,173	10,268	1,509	840,397	579,079	8,103	5,829	1	5,847	4,667
Genesee,	1,417	10,541	1,789	919,130	105,873	157,914	11,395	13	8,150	11,123
Greene,	2,349	12,592	2,083	1,191,930	21,317	74,690	6,203	23	8,561	5,513
Hamilton,	360	852	127	83,282	2,670	.....	338	.....	169	341
Herkimer,	785	36,653	2,557	1,305,377	9,068,519	54,960	9,098	10	9,125	9,102
Jefferson,	2,522	49,472	4,235	3,949,608	2,819,459	192,192	17,059	20	11,026	12,301
Kings,	41	2,834	5,500	17,425	.....	3,033,291	6,314	122	1,218	2,746
Lewis,	3,423	19,151	1,247	1.575,515	1,896,741	6,795	5,097	9	3,865	4,488
Livingston,	1,751	10,980	3,229	1,045,591	79,346½	8,825	12,502	47	8,632	10,643
Madison,	1,874	24,067	2,740	1,840,298	2,087,594	31,026	11,753	32	8,179	8,615
Monroe,	1,944	17,564	4,558	1,643,515	131,253	287,527	18,913	16	15,641	19,086
Montgomery,	1,046	16,801	2,376	1,211,385	1,538,654	68,171	8,836	3	10,610	8,224

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New-York,	.....	719	44,405	.....	.....	2,400	14,099	256	178	1,071
Niagara,	2,058	11,708	3,500	1,038,307	71,443	59,179	14,334	5	8,479	13,286
Oneida,	3,476	47,794	15,061	2,912,176	3,311,114	184,108	17,398	34	13,417	17,811
Onondaga,	2,454	24,801	4,269	2,294,287	860,644	330,273	17,330	8	14,727	16,812
Ontario,	2,113	14,202	2,848	1,223,097	205,921	217,340	13,660	159	13,161	13,258
Orange,	3,489	40,187	6,175	3,285,587¼	80,660	4,553,514	9,986	74	23,995	16,689
Orleans,	1,164	8,921	1,294	912,013	110,298	15,764	9,640	2	6,465	9,227
Oswego,	3,093	21,983	4,637	2,036,174	975,461	116,425	12,398	23	7,970	13,866
Otsego,	2,942	34,713	3,537	3,075,206	1,638,493	3,440	14,652	17	11,210	11,158
Putnam,	3,200	7,851	1,300	493,696	3,475	1,888,910	1,938	1	4,690	2,307
Queens,	1,926	9,240	1,164	441,983½	765	566,321	7,954	178	6,723	7,505
Rensselaer,	2,704	16,864	7,710	1,291,738	538,462	1,026,305	10,184	10	15,504	9,503
Richmond,	400	1,189	102	24,365	.....	34,905	845	26	663	1,063
Rockland,	573	4,708	985	266,006	2,500	278,660	3,715	170	1,669	1,516
St. Lawrence,	5,576	52,161	4,542	4,268,809	1,672,999	16,052	20,261	20	10,881	13,205
Saratoga,	2,625	16,778	4,356	1,468,136½	152,901½	88,424	11,293	2	15,206	10,797
Schenectady,	597	5,768	2,204	515,662	72,019	73,070	4,219	4	4,208	3,519
Schoharie,	2,440	18,213	2,042	1,832,257	71,016	10,225	9,682	2	9,911	8,893
Schuyler,	1,128	7,676	1,126	798,953	32,168	125	5,700	5	4,379	5,072
Seneca,	577	7,136	2,160	705,574	13,812	34,281	7,497	6	6,262	11,270
Steuben,	4,351	20,284	3,837	1,976,129	203,329	18,756	13,899	40	8,873	15,281
Suffolk,	2,006	10,833	2,238	634,405	1,580	44,120	7,111	163	9,026	10,701
Sullivan,	4,265	10,775	1,155	931,927	4,598	44,924	3,092	87	4,111	4,120
Tioga,	2,323	12,954	1,439	1,365,783	50,357	2,567	5,678	13	4,915	6,333
Tompkins,	1,666	14,572	1,440	1,645,947	60,128	36,590	9,443	3	6,608	7,750
Ulster,	4,671	17,332	4,470	1,669,631	520	88,887	9,893	58	21,086	12,939
Warren,	1,423	6,161	1,497	482,786	64,634	27,201	3,341	6	2,965	2,738
Washington,	2,100	18,689	2,994	1,625,138	634,491	30,609	11,707	11	12,980	11,325
Wayne,	1,762	16,769	2,456	1,446,080	163,763½	29,323	14,928	5	12,175	17,624
Westchester,	5,427	20,078	4,785	1,116,589	2,180	2,696,411	7,332	73	12,976	7,885
Wyoming,	2,674	16,737	2,007	1,333,948	823,105	40,554	10,358	6	4,270	7,404
Yates,	747	7,250	1,577	717,259½	59,972	12,595	6,773	8	6,666	5,920
Total,	144,597	1,068,427	225,338	90,293,073½	38,944,249½	20,965,861	579,715	2,254	530,176	539,616

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AGRICULTURAL STATISTICS, 1855.—(CONTINUED.)

COUNTIES.	SHEEP.			POULTRY.		CLOTHS OF DOMESTIC MANUFACTURES.			
	Number of sheep	Number of fleeces shorn.	Pounds of wool.	Value of poultry sold.	Value of eggs sold.	Yards of fulled cloth made	Yards of flannel made.	Yards of linen made.	Yards of cotton and mixed. goods.
Albany,	37,054	27,381	107,956	$26,314	$47,691	4,929	7,219½	2,925	2,886½
Allegany,	104,799	80,416	272,622½	7,819	11,218	3,095½	14,476	4,053½	9,337½
Broome,	40,894	27,713	86,324½	23,389	45,062	10,548	10,094	2,670	3,939
Cattaraugus,	59,725	41,080	130,996½	10 031	13,295	4,139½	15,056½	4,218	11,659
Cayuga,	103,631	98,500	348,830½	26,416	45,866	3,628½	7,751	2,370	2,840
Chautauque,	90,154	63,811	217,024	15,627	19,609	4,131½	12.243	6,948½	11,935
Chemung,	21.364	12,909	40,765½	3,802	6,689	1,573	3,315	469	1,656
Chenango,	85,923	66,049	220,092½	20,069	21,781	14,513½	14,488	5,811½	7,839
Clinton,	38,351	28,417	97,133½	5,541	11,444	2,570	5,696½	141	2,172½
Columbia,	87,549	81,064	267,368	29,701	43,831	1,294	2,995	1,392	2,894
Cortland,	41,321	34,470	120,793½	8,402	16.482	3,932	8,803	3,804	5,261½
Delaware,	71,315	42,499½	36.659½	11,526	12.999	9,084½	21,288½	2,676½	6,508½
Dutchess,	73,687	63,191	205.143½	65,687	68,913	606½	1.398½	795	393
Erie,	65,085	48,938	164.694	26,263	30.135	5,011½	10,253½	1,888½	9,500½
Essex,	47,654	38,158	134,735½	3,460	5,553	1,440	2,664½	362	1,994
Franklin,	23,958	20,175	70,737½	3,135	3,610	3,310	9,551	986	9,367½
Fulton,	16,969	10,901	37,903½	10,289	14,122	2,203½	2.537½	895	1,841
Genesee,	100,391	91,178	352,003½	71,212	13,692	352½	2,477	384	922
Greene,	19,382	14,398	50 970	14,490	22,232	2,191	3,728½	862	1,830
Hamilton,	1 481	1,048	3.251½	444	141	183	611	30	639
Herkimer,	17.706	11,254	43,561½	12,489	12,196	4,161½	5,192½	1,259½	3,497
Jefferson,	63,401	33,913	118,372½	13.348	19,298	13,063½	16,685½	4,380½	11,826
Kings,	2	2	7	1,183	2,071	.....	.....	.....	.....
Lewis,	10,086	7.624	27,046½	4,701	2,671	2,609½	8,291	1,532½	3,369
Livingston,	112,562	106,839	377,690½	8,721	11.092	2.121	4,573½	818½	1,492
Madison,	66,547	76,910	261,904½	14,454	23,878	1,986½	7,217	2,937	5,023½
Monroe,	116,817	91,910	350,468½	21,098	26,292	1,417½	4,178	364	1,388
Montgomery,	29,661	20,925	74,445½	10,513	20,705	3,026½	5,592½	2,049	1,619

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New-York,									
Niagara,	78,359	55,307½	219,903½	11 357	19,008	2,721	4,941	541	3.296
Oneida,	50,841	39,215	137,327½	22,972	31,823	5,101	11,402½	1,600	9,886
Onondaga,	94,202	84,662	318,446½	24,807	43,927	3,030½	7,373	1,341½	3,834½
Ontario,	132,725	138,842	609,075	25,128	23,018	789½	2,497½	452	1,153
Orange,	21,377	17,251	59,135	30,694	32,312	1,002	1,398½	413	135
Orleans,	91,285	64,909	255,802½	9,091	13,590	1,404½	2,679½	377	1,863
Oswego,	36,088	22,418	79,446½	13,161	26,758	7,166½	11,573½	3,137	6,740
Otsego,	109,937	82,516	278,705½	23,699	41,304	5,295	9,268½	7,419	10,797
Putnam,	5,804	4,080	14,466½	11,900	12,719	92	885	20	224
Queens,	9,714	7,084	20,592½	69,114	45,095				
Rensselaer,	64,609	59,558	187,756½	31,440	43,804	1,206	2,037	706	1,000
Richmond,	57	38	160	2,427	6,452				
Rockland,	926	460	1,585	5,384	7,374				
St. Lawrence,	86,454	70,413	246,683	9,249	16,310	19,102	29,178	4,943	36,640
Saratoga,	46,018	33,498	111,769½	28.949	46,379	1,976½	3,991	842	944
Schenectady,	10,759	7,008	26,408½	7,491	13,011	1,065½	1,782	137	478
Schoharie,	45,596	29,866	108,416½	13,824	29,197	7,649½	13,666½	7,376	6,222½
Schuyler,	48.918	40,789	152.554½	7,263	8,961	2,637½	3,532½	1,392	3,784
Seneca,	47,534	41,877	150,946	19,285	17,323	430	1,611	462	712
Steuben,	111,353	101,484	336,334	10,636	14,678	7,810	16,903	3,316½	6,905½
Suffolk,	28,016	23,178	68,281½	43,399	55,242	97	252	309	212
Sullivan,	12,591	8,027	26,622	4,384	4,059	1,874½	5,821	228	1,512
Tioga,	36,152	26,499	80,144½	6,490	11,235	3,313½	6,517	2,380	4,180
Tompkins,	61,036	47,197	160,834½	20,734	31,205	3,767	7,472	1,349	2,259
Ulster,	29,841	17,280	57,995½	28,937	39,307	3,428½	5,447	2,322½	5,248½
Warren,	16,472	11,546	39,001	3,173	5,570	3,743½	4,094½	730	2,867
Washington,	118,533	97,285	330,866½	31,402	45,193	1,133	2,277	1,255	1,633½
Wayne,	104,845	77,936	295,810	19,238	36,955	1,985½	6,241	1,227	3,611
Westchester,	11,321	9,273	30,012	47,904	43,947	207	141	36	103
Wyoming,	93,366	96,413	347,973½	10,388	13,315	2,427	6,877	3,049	4,820
Yates,	64,827	72,620	259,401	12,554	9,060	631½	1,685½	703	773
Total,	3.217,024	2.630.203	9.231,959½	$1,076,598	$1,360,673	198,203	379,922½	105,086	245,464

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THE DAIRY.

The reports of the Judges on butter and cheese exhibited at the fair at Watertown, show that the exhibition was the largest and best ever presented at our fairs—and the fact, that with so large a number of competitors so great excellence had been attained, affords the most gratifying evidence that the efforts of the Society in this direction, which have been continued from 1846, have been completely successful. The dairy districts in New-York are the most extensive of any State in our country, and the quality of butter and cheese manufactured in very many of our dairies has never been excelled. The Society will omit no efforts to improve all of our dairies, and it cannot be doubted but the same success which has attended their efforts will continue, adding yearly to the number of dairies, whose products will command the highest prices in our own country and abroad. The returns of the last census, which accompany this report will show the increase which has been secured, notwithstanding the unfavorable season in which the census was taken. While in many departments of agriculture competition from abroad may diminish the profits of agriculture here, in this department we are confident that New-York must stand pre-eminent—and increasing profits will continue as our dairymen avail themselves of the improvements which have given to our dairies the high position which many of them now sustain.

NUMBER QUARTS OF MILK REQUIRED TO MAKE A POUND OF BUTTER.

Much difference of opinion is entertained in relation to the quantity of milk required to make a pound of butter. It is true that there is a very great difference in the quality of milk from different cows. The feed, also, has much influence upon the richness of the milk. The milk of the Alderney cow will give much more butter from a given quantity of milk, than any other breed with which we are familiar—but it is very desirable to

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ascertain, as far as practicable, what is the fair average of dairies, composed of the dairy cows of this country, and treated as our best dairy cows are by good dairymen.

We requested a dairyman in this State, Joshua S. Holbert, of Chemung, to make the experiment, and furnish us with the result. He has done so and his statement will be found annexed. From this it will be seen that the fair average of the dairy, taking the season through, is *fourteen quarts of milk for a pound of butter.* We have made extensive inquiries since this statement was furnished, and the general expression of dairymen, in our own and adjoining States, corresponds with that of Mr. Holbert.

It will be seen in the report which we give of Mr. T. HORSFALL, of England, on the management of dairy cattle, that the same average is found in Mecklenburg, Prussia, Holland, and Great Britain.

It is very important that our dairymen should make careful trial of different varieties of feed, testing the qualities of each, and thus ascertain what is most beneficial, in addition to the ordinary pastures of the farm. Indian corn for soiling has been very successfully used in this State, for dairy cattle—and in the severe drought of 1854, those of our dairymen who had this resource, were enabled to make their full complement of butter, while others suffered a very great reduction in their annual produce. The Chinese Sugar Cane is recommended as favorable for this purpose, and its extensive culture during the approaching season, will doubtless test its value. The Stowell Evergreen corn has proved the most valuable variety for soiling that we have known in this State. We hope our dairymen will give attention to the subject, and communicate to the Society the results of the trials which may be made, with any variety of corn for soiling.

We would invite particular attention to the article of Mr. HORSFALL, on the management of dairy cattle. It gives the result of most careful experiments in feeding, and cannot but prove instructive and useful to every intelligent dairyman.

We have in connection with this, selected a valuable article from the Transactions of the Royal Agricultural Society, of England, by its distinguished chemist Prof. J. THOMAS WAY, on the nutritive and fattening qualities of grasses. This is the most

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full and reliable paper which we have seen, and will be the means of directing the attention of farmers and dairymen to the varieties of grasses best suited to their localities and their purposes.

JOSHUA S. HOLBERT'S STATEMENT.

CHEMUNG, *May* 5, 1856.

B. P. JOHNSON, ESQ.:

Dear sir—In order to ascertain the quantity of milk necessary to make a pound of butter, I have measured several churnings of milk, and then weighed the butter, and it takes now 15 quarts of milk to make one pound of butter. I think, to take the whole time of milking for the year, it will take 14 quarts. My father, John Holbert, thinks it will take between 13 and 14. Last fall, while feeding pumpkins, about 9 quarts made a pound.

Very respectfully, yours,
JOSHUA S. HOLBERT.

MANAGEMENT OF DAIRY CATTLE.

T. Horsfall has given an article on the management of dairy cattle from 1854 to 1856, in the Royal Ag. Society's Journal, England, vol. 17th, p. 260, part 1st. No. 37, which is worthy of the attention of every dairyman. It will be seen that there is a peculiar adaptation of the herbage of a country where the best butter is produced. His attention has been particularly directed to the production of butter, and his object has been to devise food for his milch cows adapted to their maintenance and improvement, and with this view he has paid attention to the composition of milk.

ANALYSIS OF 40 POUNDS OF MILK.

Dry material,	5.20	
Pure cassein,		2.00
Butter,		1.25
Sugar,		1.75
Phosphate of lime,		.09
Chloride of potassiun and other mineral ingred'ts,		.11
		5.20

His attention was directed to affording an ample supply of the elements of food suited to the *maintenance* and likewise to the *produce* of the animal. By the use of ordinary farm produce

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only, he could not hope to accomplish his purpose. He used cabbages, kohl rabi and mangold wurzel in moderate quantities. Of meadow hay it would require, beyond the amount necessary for the maintenance of the cow, an addition of full 20 lbs. for the supply of cassein in a full yield of milk (16 quarts;) 40 lbs. for the supply of oil for the butter; while 9 lbs. seem adequate for that of phosphoric acid.

Mr. H. says: "You cannot, then, induce a cow to consume the quantity of hay requisite for her maintenance and for a full yield of milk of the quality instanced. Though it is a subject of controversy whether butter is wholly derived from vegetable oil, yet the particular adaptation of this oil to the purpose will, I think, be admitted. I had, therefore to seek assistance from what are usually termed artificial feeding substances, and to select such as are rich in albumen, oil, and phosphoric acid; and I was bound also to pay regard to their comparative cost, with a view to profit, which, when farming is followed as a business, is a necessary, and in any circumstance, an agreeable accompaniment.

"*I think it will be found that substances peculiarly rich in nitrogenous or other elements have a higher value for special than for general purposes; and that the employment of materials, characterized by peculiar properties for the attainment of special objects, has not yet gained the attention to which it is entitled.*"

"I have omitted all reference to the heat-supplying elements—starch, sugar, &c. As the materials commonly used as food for cattle contain sufficient of these to effect this object, under exposure to some degree of cold, I have a right to calculate on a less consumption of them as fuel, and consequently a greater surplus for deposit as sugar, and probably also as fat, in consequence of my stalls being kept during winter at a temperature of nearly 60 degrees.

"I now proceed to describe the means I am using to carry out the purposes which I have sought to explain. My food for milch cows, after having undergone various modifications, has for two seasons consisted of rape-cake 5 lbs., and bran 2 lbs., for each cow, mixed with a sufficient quantity of bean-straw, oat-straw, and shells of oats, in equal proportions, to supply them three times a day with as much as they will eat. The whole of the materials are moistened, and blended together, and after being

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well steamed, are given to the animals in a warm state. The attendant is allowed 1 lb. to 1½ lbs. per cow, according to circumstances, of bean-meal, which he is charged to give to each cow, in proportion to the yield of milk, those in full milk getting two lbs., each per day; others but little: it is dry and mixed with the steamed food on its being dealt out separately; when this is eaten up, green food is given, consisting of cabbages, from October to December, khol rabi till February, and mangold till grass time. With a view to nicety of flavor, I limit the supply of green food to 30 to 35 lbs. per day for each, after each feed four pounds of meadow hay, or 12 lbs. per day is given to each cow; they are allowed water twice per day to the extent they will drink.

"As several of these materials are not commonly used as food I may be allowed some observations on their properties. Bean-straw uncooked is dry and unpalatable; by the process of steaming, it becomes soft and pulpy, emits an agreeable odor, and imparts flavor and relish to the mess. For my information and guidance I obtained an analysis of bean-straw, of my own growth, on strong and high-conditioned land; it was cut on the short side of ripeness, but yielding a plump bean. The analysis by Professor Way shows a percentage of

Moisture,	14.47
Albuminous matter,	16.38
Oil or fatty matter,	2.23
Woody fiber,	25.84
Starch, gum, &c.,	31.63
Mineral matters,	9.45
Total,	100.00

"In albuminous matter, which is especially valuable for milch cows, it has nearly double the proportion contained in meadow hay. Bran also undergoes a great improvement in its flavor by steaming, and it is probably improved in its convertibility as food; it contains about 14 per cent. of albumen, and is peculiarly rich in phosphoric acid, nearly 3 per cent. of its whole substance being of this material. The properties of rape-cake are well known. The published analysis gives it a large proportion (nearly 30 per

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cent.) of albumen. It is rich in phosphates and also in oil. This is of the unctuous class of vegetable oils, and it is to this property that I call particular attention. Chemistry will assign to this material, which has hitherto been comparatively neglected for feeding, a first place for the purpose of which I am treating. If objection should occur on account of its flavor, I have no difficulty in stating that by the preparation I have described, I have quite overcome this. I can easily persuade my cattle, (of which 60 to 80 pass through my stalls in a year), without exception, to eat the requisite quantity. Nor is the flavor of the cake in the least perceptible in the milk or butter.

"During May my cows are turned out on a rich pasture near the homestead; towards evening they are again housed for the night, when they are supplied with a mess of the steamed mixture and a little hay each morning and evening. During June, when the grasses are better grown, mown grass is given to them instead of hay, and they are also allowed two feeds of steamed mixture. This treatment is continued till October, when they are again wholly housed.

"The results which I now proceed to relate are derived from observation made with the view of enabling me to understand and regulate my own proceedings.

GAIN OR LOSS OF CONDITION ASCERTAINED BY WEIGHING CATTLE PERIODICALLY.

"For some years back I have regularly weighed my feeding stock —a practice from which I am enabled to ascertain their doings with greater accuracy than I could previously. In January, 1854, I commenced weighing my milch cows. It has been shown by what I have premised that no accurate estimate can be formed of the effect of the food on the production of milk, without ascertaining its effect on the condition of the cows. I have continued this practice once a month almost without omission up to this date. The weighings take place early in the morning, and before the cows are supplied with food; the weights are registered, and the length of time (15 months) during which I have observed this practice, enables me to speak with confidence of the results.

"The cows in full milk yielding from 12 to 15 quarts each per day, vary but little—some losing, others gaining, slightly; the balance in the month's weighing of this class being rather to gain.

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It is common for a cow to continue a yield from six to eight months before she gives below 12 quarts per day, at which time she has usually, if not invariably gained weight. The cows giving less than 12 quarts, and down to 5 quarts per day, are found, when free from ailment, to gain without exception. This gain, with an average yield of nearly 8 quarts per day, is at the rate of 7 lbs. to 8 lbs per week each.

"My cows in calf I weigh only in the incipient stages, but they gain perceptibly in condition and consequently in value. They are milked till within four to five weeks previous to calving. I give the weights of three of these, and also of one heifer which calved in March, 1855:

No.		1854.	cwt.	qrs.	lbs.	1855.	cwt.	qrs.	lbs.	Gain. lbs.
1.	Bought and weighed,	July,	10	1	20	April.	11	3	0	148
2.	" "	"	8	2	10	"	10	2	0	214
3.	" "	"	8	2	0	"	10	0	0	184
4.	Heifer which calved also in March, 1855, weighed	"	7	0	0	"	9	3	0	300

"These observations extend over lengthened periods on the same animals, of from thirty to upwards of fifty weeks. A cow, free from calf and intended for fattening, continues to give milk from ten months to a year after calving, and is then in a forward state of fatness, requiring but a few weeks to finish her for sale to the butchers. It will thus appear that my endeavors to provide food adapted to the maintenance and improvement of my milch cows have been attended with success.

"On examining the composition of the ordinary food which I have described, straw, roots and hay, it appears to contain the nutritive properties which are found adequate to the maintenance of the animal, whereas the yield of milk has to be provided for by a supply of extra food. The rape-cake, bran and bean meal which I give will supply the albumen for the casein; it is somewhat deficient in oil for the butter, whilst it will supply in excess the phosphate of lime for a full yield of milk. If I take the class of cows giving less than 12 quarts per day, and taking also into account a gain of flesh 7 to 9 pounds per week, though I reduce the quantity of extra food by giving less of the bean meal, yet the supply will be more in proportion than with a full yield; the surplus of nitrogen and phosphoric acid, or phosphate of lime, will go to enrich the manure.

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"I cannot here omit to remark on the satisfaction I derive from the effects of this treatment on the fertility of the land in my occupation. My rich pastures are not tending to impoverishment but to increased fertility; their improvement in condition is apparent. A cow in full milk, giving 16 quarts per day of the quality analysed by Haidlen, requires, beyond the food necessary for her maintenance, 6 to 8 pounds per day of the substances containing 30 or 25 per cent. of protein. A cow giving on the average 8 quarts per day, with which she gains 7 to 9 pounds per week, requires 4 to 5 pounds per day of substances rich in protein, beyond the food necessary for her maintenance. Experience of fattening gives 2 pounds per day, or 14 pounds per week, as what can be attained on an average and for a length of time. If we consider half a pound per day as fat, which is not more than probable, there will be $1\frac{1}{2}$ pounds for flesh, which, reckoned as dry material, will be about one-third of a pound; which is assimilated in increase of fibrine, and represents only $1\frac{1}{2}$ to 2 pounds of substances rich in protein beyond what is required for her maintenance.

"If we examine the effects on the fertility of the land, my milch cows, when on rich pasture, and averaging a yield of nine quarts per day, and reckoning one cow to each acre, will carry off in 20 weeks 25 lbs. of nitrogen, equal to 30 of ammonia. The same quantity of milk will carry off 7 lbs. of phosphate of lime in twenty weeks, from each acre. A fattening animal gaining flesh at the rate I have described, will carry off about one-third of the nitrogen (equal to about 10 lbs. of ammonia) abstracted by the milch cow, whilst if full grown, it will restore the whole of the phosphate.

"It is worthy of remark that experience states that rich pastures used for fattening, fully maintain their fertility through a long series of years; whilst those used for dairy cows require periodical dressings to preserve their fertility.

"If these computations be at all correct, they tend to show that too little attention has been given to the supply of substances rich in nitrogenous compounds in the food for our milch cows, whilst we have laid too much stress on this property in the food for fattening cattle. They tend also to the inference that, in the effects on the fertility of our pastures used for dairy purposes, we

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derive advantage not only from the phosphate of lime, but also from the gelatine of bones used as manure.

"On comparing the results from my milch cows fed in summer on rich pasture, and treated at the same time with the extra food I have described, with the results when on winter food, and whilst wholly housed, taking into account both the yield of milk and the gain of weight, I find those from stall-feeding fully equal to those from the pasture. The cows which I buy as strippers, for fattening, giving little milk, from neighboring farmers who use ordinary food, such as turnips with straw or hay, when they come under my treatment, increase their yield of milk, until after a week or two they give two quarts per day more than when they came, and that too of a much richer quality.

RICHNESS OF MILK AND CREAM.

"I sometimes observe in the weekly publications which come under my notice, accounts of cows giving large quantities of butter; these are usually, however, extraordinary instances, and not accompanied with other statistical information requisite to their being taken as a guide; and it seldom happens that any allusion is made to the effects of the food on the condition of the animals, without which no acccurate estimate can be arrived at. On looking over several treatises to which I have access, I find the following statistics on dairy produce:—

"Mr. Morton, in his "Cyclopedia of Agriculture," p. 621, gives the results of the practice of a Mr. Young, an extensive dairy keeper in Scotland. The yield of milk per cow is stated at 680 gallons per year; he obtained from 16 quarts of milk, 20 oz. of butter, or for the year 227 lbs. per cow; from one gallon of cream 3 lbs. of butter, or 12 oz. per quart. Mr. Young is described as a high feeder; linseed is his chief auxiliary food for milch cows. Professor Johnston, (Elements of Agricultural Chemistry,) gives the proportion of butter from milk at 1½ oz. per quart, or from 16 quarts 24 oz.; being the produce of four cows of different breeds—Alderney, Devon and Ayrshire—on pasture and in the height of the summer season. On other four cows of the Ayrshire breed, he gives the proportion of butter from 16 quarts as 16 oz. being 1 oz. per quart. These cows were likewise on pasture. The same author states the yield of butter as one-fourth of the weight of cream, or about 10 oz. per quart. Mr. Rawlinson,

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(Journal of Royal Agricultural Society, vol. 13, p. 38) gives the produce of 20,110 quarts of milk churned by hand, as 1,109 lbs. of butter, being at the rate of fully 14 oz. per 16 quarts of milk; and from 23,156 quarts of milk 1,525 lbs. of butter, being from 16 quarts nearly 16¾ oz. of butter. The same author states that the yield of butter derived from five churnings of 15 quarts of cream each, is somewhat less than 8 oz. per quart of cream. Dr. Muspratt, in his work on the Chemistry of Arts and Manufactures, which is in the course of publication, gives the yield of butter from a cow, per year, in Holstein and Lunenburg at 100 lbs., in England at 160 lbs. to 180 lbs. The average of butter from a cow in England is stated to be 8 or 9 oz. per day, which on a yield of 8 to 9 quarts, is 1 oz. per quart, or for 16 quarts 16 oz. The quantity of butter derived from cream is stated as one-fourth, which is equal to about 9 oz. per quart. The richest cream of which I find any record is that brought to the Royal Society's meeting during the month of July, for the churns which compete for the prize. On referring to the proceedings of several meetings, I find that 14 oz. per quart of cream is accounted a good yield.

"I have frequently tested the yield of butter from a given quantity of my milk. My dairy produce is partly disposed of in new milk, partly in butter and old milk, so that it became a matter of business to ascertain by which mode it gave the best return. I may here remark that my dairy practice has been throughout on high-feeding, though it has undergone several modifications. The mode of ascertaining the average yield of butter from milk, has been to measure the milk on the churning day after the cream has been skimmed off, then to measure the cream, and having, by adding together the two measurements, ascertained the whole quantity of milk, (including the cream) to compare it with that of the butter obtained. This I consider a more accurate method than measuring the new milk, as there is a considerable escape of gas, and consequent subsidence, whilst it is cooling. The results have varied from 24 to 27¼ oz. from 16 quarts of milk. I therefore assume in my calculation 16 quarts of milk as yielding a roll (25 ounces) of butter.

"As I have at times a considerble number of cows bought as strippers, and fattened as they are milked, which remain sometimes in

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my stalls eight or nine months, and yield toward the close but five quarts per day, I am not enabled to state with accuracy and from ascertained data the average yield per year of my cows kept for dairy purposes solely. However, from what occurs at grass-time, when the yield is not increased, and also from the effects of my treatment on cows which I buy, giving a small quantity, I am fully persuaded that my treatment induces a good yield of milk. My cows are bought in the neighboring markets with a view to their usefulness and profitableness. The breeds of this district have a considerable admixture of the Short horn, which is not noted for the richness of its milk. During the time these observations have been continued, on the proportion of butter from cream, more than one-half of my cows have been changed.

"Having satisfied myself *that the peculiar richness of my cream was due mainly to the treatment of my cows*, which I have sought to describe, it occurred to me that I ought not to keep it to myself; inasmuch as these results of my dairy practice not only afforded matter of interest to the farmer, but were fit subjects for the investigation of the physiologist and the chemist. Though my pretensions to acquirements in their instructions are but slender, they are such as enable me to acknowledge benefit in seeking to regulate my proceedings by their rules.

"In taking off the cream, I use an ordinary shallow skimmer of tin, perforated with holes, through which any milk, gathered in skimming, escapes. It requires care to clear the cream; and even with this some streakiness is observable on the surface of the skimmed milk. The milk bowls are of glazed brown earthenware, common, in this district; they stand on a base of 6 to 8 inches, and expand at the surface to nearly twice that width. Four to five quarts are contained in each bowl, the depth being 4 to 5 inches at the center. The churn I use is a small wooden one, worked by hand, on what I believe to be the American principle. I have forwarded to Professor Way a small sample of butter for analysis; 15 quarts of cream were taken out of the cream jar, and churned at three times in equal portions.

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The first five quarts of cream gave,	127	oz. of butter.
The second " " "	125	" "
The third " " "	120½	" "
	372½	oz.

Equal to 24¾ oz. per quart.

At a subsequent churning of 14 quarts of cream

The first seven gave seven rolls or,	175	oz. of butter.
The second seven gave seven rolls, 2 oz. or	177	" "
	352	

Equal to 25¼ oz. per quart.

"On testing the comparative yield of butter and of butter-milk, I find 70 per cent. of butter, to 30 per cent. of butter-milk, thus reversing the proportions given in the publication to which I have referred. An analysis of my butter by Professor Way gives,

Pure fat or oil,	82.70
Casein or curd,	2.45
Water with a little salt,	14.85
	100.00

"The only analysis of this material which I find in the publications in my hand, are by Professor Way, (Journal, vol. 11, p. 735) "on butter by the common and by the Devonshire method;" the result in 100 parts being

	Raw.	Scalded.
Pure butter,	79.72	79.12
Casein, &c.,	3.38	3.37
Water,	16.90	17.51
Total,	100.00	100.00

"The foregoing observation of dairy results was continued up to grass time in 1855. In April and May the use of artificial means was discontinued without diminution in the yield of butter or richness of cream, the natural temperature being sufficient to maintain that of my dairy at 54° to 56°.

"I now proceed to describe the appearances since that time. In the summer season whilst my cows were grazing on the open pastures during the day, and housed during the night, being supplied with a limited quantity of steamed food each morning and evening, a marked change occurred in the quality of the milk

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and cream; the quantity of the latter somewhat increased; but instead of 25 oz. of butter per quart of cream, my summer cream yielded only 16 oz. per quart.

"I would not be understood to attribute this variation in quality to the change of food only. It is commonly observed by dairy keepers that milk during the warm months of summer is less rich in butter, owing probably to the greater restlessness of the cow from being teased by the flies, &c. I am by no means sure that, if turning out during the warm months be at all advisable, it would not be preferable that this should take place during the night instead of during the day time. Towards the close of September, when the temperature had become much cooler and the cows were supplied with a much larger quantity of the steamed food, results appeared very similar to those which I had observed and described from December to May, 1855. During the month of November the quality was tested with the following results:

"From 252 quarts of old milk were taken 21 quarts of cream, of which 20 were churned, and produced 468 oz. of butter, which shows: 27.50 oz. of butter for 16 quarts of new milk; 23.40 oz. of butter for each quart of cream.

"During May, 1856, my cows being on the open pasture during the day, were supplied with two full feeds of the steamed mixture, together with a supply of green rape plant each morning and evening. The result was, that from 324 quarts of old milk 23 quarts of cream were skimmed, of which 22 were churned, and produced 515 oz. of butter, which shows: 24 oz. of butter from 16 quarts of new milk; 22.41 oz. of butter from each quart of cream.

"There is doubtless some standard of food adapted to the constitution and purposes of animals, combining with bulk a due proportion of elements of respiration, such as sugar, starch, &c., together with those of nutrition, viz.: Nitrogenous compounds, phosphates and other minerals; nor can we omit oil or fat-forming substances; for however we may be disposed to leave to philosophy, the discussion as to whether sugar, starch, &c., are convertible into fat, yet I think I shall not offend the teacher of Agricultural Chemistry by stating that the more closely the elements of food resemble those in the animal and its product, the more effica-

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cious will such food be for the particular purpose for which it is used.

"Sugar, starch, &c., vary considerably, in form and proportion, from vegetable oils, which closely resemble animal fats.

"When we consider that plants have a two-fold function to perform, viz.: to serve as food for animals, and also for the reproduction of the like plants, and that after having undergone the process of digestion they retain only one-half or one-third of their value as manure, the importance of affording *a due but not excessive supply* of each element of food essential to the wants and purposes of the animal will be evident. If we fall short, the result will be imperfect; if we supply in excess, it will entail waste and loss.

"Linseed and rape cake resemble each other very closely in chemical composition. The latter is chiefly used for manure, and its price ranges usually about half that of linseed cake. In substances poorer in nitrogen and with more of starch, gum, oil, &c., the disparity in value as food and as manure will be proportionately greater.

"During the present season, Mr. Mendelssohn, of Berlin, and Mr. Gausange, who is tenant of a large royal domain, near Frankfort, on the Oder, on which he keeps about 150 dairy cows, have been my visitors. These gentlemen have collected statistics in dairy countries through which they have traveled. I learned from them that in Mecklenburg, Prussia, Holland, &c., 14 quarts of milk yield on the average 1 lb. of butter; in rare instances 12 quarts are found to yield 1 lb. Both attach great importance to the regulation of the temperature. Mr. Mendelssohn tells me that the milk from cows fed on draff, (distillers' refuse) requires a higher temperature to induce its yield of butter than that from cows supplied with other food.

"On inquiry in my own neighborhood, I find it is computed that each quart at a milking represents 1 lb. of butter per week. Thus a cow which gives 4 quarts at each milking, will yield in butter 4 lbs. per week, or from 56 quarts, 64 oz. of butter, or from 14 quarts of milk, 1 lb. of butter. Taking the winter produce alone, it is lower than this. The cream from my neighbors' cows, who use common food,—hay straw, and oats,—somewhat resembles milk in consistency, and requires three to four hours,

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some times more, in churning. On one occasion a neighboring dairywoman sent to borrow my churn, being unable to make butter with her own. I did not inquire the result. If she had sent her cow, I could in the course of a week have insured her cream which would make butter in half an hour. These dairy people usually churn, during winter, in their kitchens, or other room with a fire. Each of them states that from bean or oat meal, used during winter as an auxiliary food, they derive a greater quantity of butter; whilst those who have tried linseed oil have perceived no benefit from it.

"My own cream during the winter season, is of the consistency of paste or thick treacle. When the jar is full, a rod of two feet long will, when dipped into the cream to half its length, stand erect. If I take out a tea-cup full in the evening and let it stand till morning, a penny piece laid on its surface will not sink; on taking it off I find the underside partially spotted with cream. The churnings are performed in a room without fire, at a temperature in winter of 43° to 45° and occupy one-half to three-quarters of an hour. My dairy is but six feet wide by fifteen long, and twelve high, at one end (to the north) is a trellis window, at the other an inner door which opens into the kitchen. There is another door near to this which opens into the churning room, having also a northern aspect; both doors are near the south end of the dairy. Along each side, and the north end, two shelves of wood are fixed to the wall, the one fifteen inches above the other; two feet higher is another shelf, somewhat narrower but of like length, which is covered with charcoal, whose properties as a deodoriser are sufficiently established. The lower shelves being two feet three inches wide, the interval or passage between is only one foot six inches. On each tier of shelves is a shallow wooden cistern lined with thin sheet lead, having a rim at the edges three inches high. These cisterns incline downwards slightly towards the window, and contain water to the depth of three inches. At the end nearest the kitchen each tier of cisterns is supplied with two taps, one for cold water in summer, the other with hot for winter use. At the end next the north window is a plug or hollow tube, with holes perforated at such an elevation as to take the water before it flows over the cistern.

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"During the summer the door towards the kitchen is closed, and an additional door is fixed against it, with an interval between, well packed with straw; a curtain of stout calico hangs before the trellis window, which is dipped in salt water, and kept wet during the whole day by cold water spurted over it from a gutta percha tube. On the milk being brought in it is emptied into bowls Sometime after these bowls (of which a description is given in a former part of this) have been placed on the cistern, the cold water taps are turned till the water rises through the perforated tube, and flows through a waste pipe into the sewer. The taps are then closed so as to allow a slight trickling of water which continues through the day. By these means I reduce the temperature as compared with that outside the window, by 20° I am thus enabled to allow the milk to stand till the cream has risen and keep the skimmed milk sweet, for which I obtain 1d per quart.

"Having heard complaints during very hot weather, of skimmed milk, which had left my dairy perfectly sweet, being affected so as to curdle in cooking, on being carried into the village, I caused covers of thick calico (the best of our fabrics for retaining moisture) to be made. These are dipped in salt water and then drawn over the whole of the tin milk cans. The contrivance is quite successful, and is in great favor with the consumers. I have not heard a single complaint since I adopted it.

"Finding my butter rather soft in hot weather, I uncovered a draw-well, which I had not used since I introduced water-works for the supply of the village and my own premises. On lowering a thermometer down the well, to a depth of 28 feet, I found it indicated a temperature of 43°, that on the surface being 70°. I first let down the butter, which was somewhat improved, but afterwards the cream. For this purpose I procured a moveable windlass, with a rope of the required length. The cream jar is placed in a basket, 2 feet 4 inches deep, suspended on the rope, and let down the evening previous to churning. It is drawn up early next morning and immediately churned. By this means the churning occupies about the same time as in winter, and the butter is of like consistency. The advantage I derive from this is such that, rather than be without it, I should prefer sinking a well for the purpose of reaching a like temperature.

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"When winter approaches, the open trellis window is closed, an additional shutter being fixed outside, and the interval between this and an inner shutter closely packed with straw, to prevent the access of air and cold; the door to the kitchen is at the same time unclosed, to admit warmth. Before the milk is brought from the cow-house, the dairymaid washes the bowls well with hot water, the effect of which is to take off the chill, but not to warm them; the milk is brought in as milked, and is passed through a sile into the bowls, which are then placed on the cistern. A thermometer, with its bulb immersed in the milk, denotes a temperature of about 90°. The hot water is applied immediately, at a temperature of 100°, or upwards, and continues to flow for about five minutes, when the supply is exhausted. The bowls being of thick earthenware—a slow conductor—this does not heighten the temperature of the milk. The cooling, however, is thereby retarded, as I find the milk, after standing four hours, maintains a temperature of 60°. This application of hot water is renewed at each milking to the new milk, but not repeated to the same after it has cooled. The temperature of the dairy is momentarily increased to above 60°, but speedily subsides, the average temperature being 52° to 56°.

"It will be observed that the churnings in summer and winter occupy half an hour or upwards. By increasing the temperature of the cream, I could easily churn in half the time, but I should thereby injure the quality of the butter. When the butter has come, and gathered into a mass, it is taken, together with the butter milk, out of the churn, which is rinsed with water. The butter is then placed again in the churn, with a quantity of cold spring water in which salt has been dissolved, at the rate of 1 oz. per quart of cream. After a few minutes churning, the butter is again taken out; the water in which it has been washed assumes a whitish appearance. By this process the salt is equally diffused through the butter, which requires little manipulation, and is freed from a portion of caseous matter. A recent analysis of my butter shows only 1.07 instead of 2.45 per cent. of casein, as before; that it ranks as choice may be inferred, when I state that my purchaser willingly gives me 1 d. per roll more than the highest price in Otley market, and complains that I do not supply him with a greater quantity.

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"In this dairy, of the small dimension I have described, my produce of butter reaches, at times, 60 to 70 lbs per week. Though the size may appear inconveniently small, yet I beg to remark on the greater facility of regulating the temperature of a small in comparison with a large dairy. This difficulty will be found greater in summer than in winter, as it is far easier to heighten than depress the temperature.

"I have cooked or steamed my food for several years. It will be observed that I blend bean straw, bran and malt combs, as flavoring materials, with oat and other straw and rape cake. The effect of steaming is to volatilise the essential oils, in which the flavor resides, and diffuse them through the mess. The odor arising from it resembles that observed from the process of malting. This imparts relish to the mess, and induces the cattle to eat it greedily; in addition to which I am disposed to think that it renders the food more easy of digestion and assimilation. I use this process with advantage for fattening when I am deficient in roots. With the same mixed straw and oat shells, 3 to 4 lbs. each of rape cake, aud half a pound of linseed oil, but without roots, I have fattened more than 30 heifers and cows free from milk, from March up to the early part of May; their gain has averaged fully 14 lbs. each per week—a result I could not have looked for from the same materials if uncooked. This process seems to have the effect of rendering linseed oil less of a laxative, but cannot drive off any portion of the fattening oils, to volatilise which requires a very high temperature. My experience of the benefits of steaming is such, that if I were deprived of it I could not continue to feed with satisfaction. I have weighed my fattening cattle for a number of years, and my milch cows for more than two years; this practice enables me at once to detect any deficiency in the performance of the animals; it gives also a stimulus to the feeders, who attend at the weighings, and who are desirous that the cattle entrusted to their care should bear a comparison with their rivals. Another obvious advantage is in avoiding all cavils respecting the weight by my purchasers, who, having satisfied themselves as to the quality of the animal, now ask and obtain the most recent weighing. The usual computation for a well fed but not over fat beast, is live to dead weight as 21 to 12,

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or 100 to 59$\frac{1}{7}$, with such modifications as suggest themselves by appearances.

"Though many discussions have taken place on the fattening of cattle, the not less important branch of dairy treatment has hitherto been comparatively neglected. I therefore venture to call attention to considerations which have risen from observations in my own practice, affecting the chemistry and physiology, or, in other words, the science of feeding. That I am seeking aid from its guidance, will be apparent, and I have no hesitation in admitting, that beyond the satisfaction from the better understanding of my business, I have latterly derived more benefit or profit from examination of the chemical composition of materials of food than from the treatment or feeding experiments of others which have come under my notice. So persuaded am I of the advantage of this, that I do not feel satisfied to continue the use of any material with the composition of which I am not acquainted, without resorting to the Society's Laboratory for an analysis.

"*To one leading feature of my practice I attach the greatest importance—the maintenance of the condition of my cows, giving a large yield of milk.* I am enabled, by the addition of bean meal in proportion to the greater yield of milk, to avert the loss of condition in those giving from 16 to 18 quarts per day; whilst on those giving a less yield and in health, I invariably effect an improvement.

"When we take into consideration the disposition of a cow to apply her food rather to her milk than to her maintenance and improvement, it seems fair to infer that the milk of a cow gaining flesh will not be deficient either in casein or butter. I have already alluded to the efficiency of bean meal in increasing the quantity of butter; I learn also, from observant dairymen who milk their own cows and carry their butter to market, that their baskets are never so well filled as when their cows feed on green clover, which, as dry material, is nearly as rich in albumen as beans. I am also told by those who have used green rape plant, that it produces milk rich in butter. From this we may infer that albuminous matter is the most essential element in the food of the milch cow, and that any deficiency in the supply of this will be attended with loss of condition, and a consequent diminution in the quality of her milk.

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"I am clearly of opinion that you can increase the proportion of butter in milk more than that of casein, or other solid parts. From several, who have adopted my treatment, I learn that on substituting rape cake for beans they perceive an increased richness in their milk. Mr. T. Garnett, of Clitheroe, who has used bean meal largely as an auxiliary food for milch cows during the winter season, tells me that when rape cake is substituted, his dairy-maid, without being informed, perceives the change from the increased richness of the milk. Mr. Garnett has also used linseed cake in like quantity, still his dairy people prefer rape cake. Mr. Whelon of Lancaster, who keeps two milch cows for his own use, to which he gave bean meal and bran as auxiliaries, has recently substituted rape cake for bean meal; he informs me that in a week he perceived a change in the richness of the milk, with an increase of butter.

"The vegetable oils are of two distinct classes: the *drying* or *setting* represented by linseed, the *unctuous* represented by rape oil. They consist of two proximate elements, margerine and olein; in all probability they will vary in their proportion of these, but in what degree I have not been able to ascertain. Though the Agricultural Chemists make no distinction as far as I am aware, between these two classes of oils, the practitioners in medicine use them for distinct purposes. Cod liver oil has long been used for pulmonary complaints; latterly, olive, almond and rape oils are being employed as substitutes. These are all of the unctuous class of oils. Mr. Rhind, the intelligent medical practitioner of this village, called my attention to some experiments by Dr. Leared, published in the "Medical Times," July 21st, 1855, with olein alone, freed from margerine, which showed marked superiority in the effect; and I now learn from Mr. Rhind that he is at present using with success the pure olein, prepared by Messrs. Price & Co. from cocoanut oil, one of the unctuous class; that linseed and others of the drying oils are used in medicines for a very different purpose, it seems unnecessary to state.

"The olein of oil is known to be more easy of consumption and more available for respiration than margerine—a property to which its use in medicine may be attributable. (See Lehman's Physiological Chemistry.) If we examine the animal fats, tallow suet, and other fats, they are almost wholly of the solid class,

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stearine or margerine, closely resembling or identical with the margerine in plants; whilst butter is composed of olein and margerine, combining both the proximate elements found in vegetable oils.

"It seems worthy of remark that a cow can yield a far greater weight of butter than she can store up in solid fat. Numerous instances occur where a cow gives off 2 lbs. of butter per day, or 14 lbs. per week, whilst half that quantity will probably rarely be laid on in fat. If you allow a cow to gain 16 lbs. per week and reckon 7 for fat, there will only remain 9 lbs. for flesh, or, deducting the moisture, scarcely 3 lbs. (2.97) per week, equal to 42, or less than half a pound per day, of dry fibrine. The analyses of butter show a varying proportion of olein and margerine fats: Summer butter usually contains of olein 60 and margerine 40 per cent., whilst in winter butter these proportions are reversed, being 40 of olein and 60 of margerine. By ordinary treatment the quantity of butter during winter is markedly inferior. The common materials for dairy cows in winter are straw, with turnips or mangel, hay alone, or hay with mangel. If we examine these materials, we find them deficient in oil, or in starch, sugar, &c. If a cow consumes 2 stones or 28 lbs. of hay a day, which is probably more than she can be induced to eat on an average, it will be equal in dry material to more than 100 lbs. of young grass, which will also satisfy a cow. That 100 lbs. young grass will yield more butter will scarcely admit of a doubt. The 28 lbs. of hay will be equal in albuminous matter and in oil to the 100 lbs. of grass, but in the elements of starch, sugar, &c., there is a marked difference. During the growth of the plant, the starch and sugar are converted into woody fibre, in which form they are scarcely digestible or available for respiration. It seems, then, not improbable that, when a cow is supplied with hay only, she will consume some portion of the olein oil for respiration, and yield a less quantity of butter, poorer in olein.

If you assume butter to contain of olein,	60	per cent.
" " " " " margerine,	40	"
	100	"
If the cow consume of the olein,	36	"
The quantity of butter will be reduced from 100 to,	64	"

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And the proportions will then be of olein,..... 40 per cent.
Of margerine,..... 60 "

100 "

"If you supply turnips or mangel with hay, the cow will consume less of hay. You thereby substitute a material richer in sugar, &c., and poorer in oil. Each of these materials in the quantity a cow can consume, is deficient in the supply of albumen necessary to keep up the condition of an animal, giving a full yield of milk. To effect this, recourse must be had to artificial or concentrated substances of food, rich in albuminous matter.

"It can scarcely be expected, nor is it desirable, that practical farmers should apply themselves to the attainment of proficiency in the art of chemical investigations. This is more properly the occupation of the professor of science. The following simple experiment, however, seems worthy mentioning: On several occasions, during winter, I procured samples of butter from my next neighbor. On placing these, with a like quantity of my own, in juxtaposition before the fire, my butter melted with far greater rapidity—by no means an unsafe test of a greater proportion of olein.

"The chemical investigation of our natural and other grasses, has hitherto scarcely had the attention which it deserves. The most valuable information on this subject is in the paper by Professor Way, on the nutritive and fattening properties of the grasses (annexed). These grasses were nearly all analyzed at the flowering time,—a stage at which no occupier of grass-land would expect so favorable a result in fattening. We much prefer pastures with young grass not more than a few inches high, sufficient to afford a good bite. With a view to satisfy myself as to the difference of composition of the like grasses at different stages of growth, I sent to Professor Way a specimen of the first crop of hay, cut in the end of June, when the grass was in the early stage of flowering, and one of aftermath, cut towards the close of September, from the same meadow, the analyses of which I give:

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HAY FIRST CROP.		AFTERMATH HAY.	
Moisture,	12.02	Moisture,	11.87
Albuminous matter,	9.24	Albuminous matter,	9.84
Oil and fatty matter,	2.68	Oil and fatty matter,	6.84
Starch, gum, sugar,	39.75	Starch, gum, sugar,	42.25
Woody fiber,	27.41	Woody fiber,	19.77
Mineral matter,	8.90	Mineral matter,	9.43
	100.00		100.00

"A comparison between these will show a much greater percentage of woody fiber, 27.41 in the first crop to 19.77 in the aftermath. The most remarkable difference, however, is in the proportion of oil, being 2.68 in the first crop to 6.84 in the aftermath. On inquiry from an observant tenant of a small dairy farm of mine, who has frequently used aftermath hay, I learn that, as compared with the first crop, he finds it induce a greater yield of milk, but attended with some impoverishment in the condition of the cow, and that he uses it without addition of turnips or other roots, which he gives when using hay of the first crop—an answer quite in accordance with what might be expected from its chemical composition.

"It is likewise to be presumed that the quickness of growth will materially affect the composition of grasses, as well as of other vegetables. Your gardener will tell you that if radishes are slow in growth they will be tough and woody, that asparagus melts in eating like butter, and salad is crisp when grown quickly. The same effect will, I apprehend, be found in grasses of slow growth: they will contain more of woody fiber, with less of starch or sugar. The quality of butter grown on poor pastures is characterized by greater solidity than on rich feeding pastures, the cows having to travel over more space require a greater supply of the elements of respiration; whilst the grasses grown on these poor pastures contain, in all probability, less of these in a *digestible form* available for respiration. The like result seems probable as from common winter treatment—a produce of butter less in quantity and containing a greater portion of margerine and a less of olein.

"It is well known that pastures vary greatly in their butter-producing properties; there is, however, as far as I am aware, no

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satisfactory explanation of this. If you watch cows on depasture, you observe them select their own food; if you supply cows in stall alike with food, they will also select for themselves. I give rape cake as a mixture to all, and induce them to eat the requisite quantity; yet some will select the rape cake first, and eat it up clean, whilst others rather neglect it till towards the close of their meal, and then leave pieces in the trough. Two Alderneys—the only cows of the kind I have as yet had—whose butter-producing qualities are well known, are particularly fond of rape cake, and never leave a morsel. May not these animals be prompted by their instinct to select such food as is best suited to their wants and propensities? If so, it seems of the greatest importance that the dairyman should be informed of the properties of food most suitable for his purpose, especially whilst in a stall where they have little opportunity of selecting.

"It appears worth the attention of our Society to make inquiries as to the localities which are known as producing milk peculiarly rich in butter. When traveling in Germany I well recollect being treated with peculiarly rich milk, cream and butter, on my tour between Dresden and Toplitz, at the station or resting place, on the Chaussee or turnpike road, before you descend a very steep incline to the valley in which Toplitz is situated. I travelled this way after an interval of several years, when the same treat was again offered. It was given as a rarity, and can only be accounted for by the peculiar adaptation of the herbage of the country for the production of butter.

NUTRITIVE AND FATTENING QUALITIES OF GRASSES.

In connection with the subject discussed in Mr. Horsfall's paper, we give extracts from an article in the Transactions of the Royal Agricultural Society of England, vol. 14, p. 171, "*On the relative Nutritive and Fattening properties of different natural and artificial grasses*," by J. THOMAS WAY, *Consulting Chemist to the Society*. This is much more full and reliable than that of Sir George Sinclair, Bart., *Hortus Gramineus Woburnensis*—published in 1824, which heretofore has been the only work on grasses, to which reference is made.

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We consider Prof. Way, with whom we had the pleasure of forming an acquaintance in 1851, to be one of the most careful and reliable chemists of the day. In all his investigations, his object is to arrive *at truth*, not to sustain or support any particular theory. It is this that gives confidence to the farmer, and will induce him to examine with care every investigation which is made under such auspices, to aid him in his work.

Prof. Way, says: "It is very generally known to those who have interested themselve in the history and progress of agriculture in Great Britain, that at an early period of the present century the Duke of Bedford, impressed with the importance of ascertaining, so far as possible, the relative productiveness of different kinds of grasses, and also their relative nutritive value for the feeding of animals, set on foot a series of experiments at Woburn, to determine these points. To Mr. George Sinclair the conduct of this investigation was deputed; and to this day Mr. Sinclair's excellent work, embodying the results that were obtained remains the text book on the grasses.

"Mr. Sinclair's method was simple enough. He had two questions to determine; the *first* of these being the relative productiveness of different grasses, or in other words, what quantity of each might be grown on a given area of soil, of different qualities and capabilities. To determine this point Mr. S. had recourse to the obvious method of growing the different grasses in plots of a definite size, and carefully weighing the produce of each.

"The *second question*—that of the nutritive quality of the grasses so grown—required for its solution an expenditure of greater skill; and Sir Humprey Davy was asked to suggest the proper method.

"The plan suggested and adopted, was also very simple. A given weight of the grass, either in its natural state or after being dried, was submitted to the action of hot water, till all the soluble parts were taken up. The liquid was then separated from the undissolved woody matter by filtration, and carefully evaporated to dryness. The dry product thus obtained was taken as the measure of the nutritive matter of the specimen examined. In this way the greater number of the true grasses and other plants found in or suitable to pastures was carefully examined, and the results were given in Mr. Sinclair's work. There can be

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no doubt that this method of finding the nutritive matter of the plants afforded data which could not fail to be of value to the intelligent agriculturist, and that it was the best which the state of science at that time could offer, or which with a moderate outlay of labor, was possible, is sufficiently guaranteed by the name of the great chemist who suggested it.

"But chemistry and physiology have made gigantic strides since that time. We have learnt to separate and identify the chemical principles, of which plants are made up, and their composition and properties have been intimately studied. Physiology, on the other hand, has taught us to a considerable extent the part which these principles play in the nutrition of animals. It has shown us that from one is formed flesh, from another fat, whilst to others, again, is allotted the office of supporting respiration and producing animal heat. It is not meant that science was entirely at fault on these points at the period in question, but there can be no doubt that the greater part of our present knowledge of the subject is of much later date.

* * * It has long been evident to all who have paid any attention to these subjects, that Mr. Sinclair's determinations of nutritive equivalents for different grasses, however valuable they were at the time they were executed, are quite unsuitable to our present more advanced stage of knowledge.

"It may be shortly stated that modern chemistry has divided the principles of plants into two great classes—the one including all those vegetable principles which contain *nitrogen*, the other comprising those which are destitute of this element. * * * * * "The plan adopted by Mr. Sinclair for the determination of the nutritive properties of the grasses, was defective in more ways than one. In the first place, it afforded no kind of information as to the relative quantity of flesh-forming, fattening, and heat-producing compounds existing in the plants; and in the second, it did not even give a correct idea of the proportion of all these substances taken collectively—since, with our present knowledge of the properties of the nitrogenous principles, we cannot doubt that treatment with hot water would fail to extract the most nutritive portions of the grass.

"As a supplement to Mr. Sinclair's excellent work, and a subject not unworthy of considerable labor, it seemed desirable to exam-

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ine some of these grasses anew, bringing to the inquiry the aid of more recent physiological principles, and the methods of modern chemical research.

* * * * "To have undertaken the proximate analysis of so large a series of specimens as the grasses present,—to have separately ascertained the quantity of each nitrogenous and non-nitrogenous principle they contained, would have been, if not impossible, (within any moderate space of time), at least useless, for our other knowledge of nutrition of animals is not sufficiently advanced to enable us to make use of such data. But on the other hand, it was possible to direct our efforts to the acquisition of that class of facts which could immediately be made available in relation to existing physiological knowledge; and with that view, I decided upon ascertaining, so far as might be, not the quantity of each vegetable principle present, in the different grasses, but that of each class of such principles. The analyses that follow will be found to embrace the following particulars:

1st. The proportion of *water* in each grass as taken from the field. The necessity for this determination is obvious.

2d. The proportion of *albuminous or flesh-forming principles*, including, without distinction, all the nitrogenous principles.

3d. The proportion of oily or fatty matters which may be called *fat-producing principles.*

4th. The proportion of elements of respiration or *heat-producing principles*, under which head are comprised starch, gum, sugar, pectic acid, &c., in fact, all the non-nitrogenous principles, with the exception of fatty matter and woody fiber.

5th. Woody fiber.

6th. Mineral matter or ash.

"It will be observed that some of these particulars are rather of negative than of direct interest. Water, for instance, in a plant, is of no value in feeding animals, but its proportion is a necessary element of our calculations, because, with the variations in quantity of moisture, will be corresponding variations, though in the opposite sense, of the real nutritive matter of the plant.

"The woody fiber of plants is considered to have no value in a nutritive point of view, except that (which, by the way, is sufficiently important) of giving bulk to the food. Still its deter-

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mination in this respect was necessary, and was, indeed, an indispensable step in the process of analyses. The same may be said with regard to the mineral matter or ash.

"Under the foregoing heads we have acquired it is hoped a very important amount of information—such, too, that it can be immediately brought to bear upon the practical nutritive values of the different grasses.

"The grasses, sixty or seventy specimens, each individual plant composing the sample of 2 or 3 lbs. weight were taken from meadows in which they were growing naturally and healthy. The grasses were collected, plant by plant, at the time of flowering (except when otherwise stated.)

"To economize space and afford facilities for comparison, the analyses are collected in tables. I shall divide them into two classes, which for convenience sake, may be called the natural and artificial grasses, respectively.

"The tables I. and II. contain the botanical and common names of each grass, the nature of the soil, and the date of the collection of the different specimens:

TABLE I.—*Natural Grasses.*

Botanical Names.	Common Name.	Date collection, 1849.	Nature of Soil.
Anthoxanthum odoratum,	Sweet scented vernal grass,	May 25,	L'm or calcar's rubble
Alopecurus pratensis,	Meadow fox tail grass,	June 1,	Calcareous loam with gravelly sub-soil.
Arrhenatherum avenaceum	Common oat-like grass,	July 17,	Forest marble loam.
Avena flavescens,	Yellow oat-like grass,	June 29,	" "
Avena pubescens,	Downy oat grass,	July 11,	Dry calcareous loam.
Briza media,	Common quaking grass,	June 29,	Forest marble.
Bromus erectus,	Upright brome grass,	June 23,	Calcareous loam.
Bromus mollis,	Soft brome grass,	May 8,	Stiff loam.
Cynosurus cristatus,	Crested dogs-tail grass,	June 21,	Calcareous loam.
*Dactylis glomerata,	Cocksfoot grass,	June 13,	" on gravel.
Do. 2d spec., seeds ripe,		July 19,	Calcareous loam.
Festuca duriuscula,	Hard fescue grass,	June 13,	Dry calcareous loam.
Holcus lanatus,	Soft meadow grass,	June 29,	Calcareous loam.
Hordeum pratense,	Meadow barley,	July 11,	" on gravel.
Lolium perenne,	Perennial rye grass or darnel,	June 8,	Calcare's rubbly l'm.
Lolium italicum,	Italian rye grass,	June 13,	Forest marble loam.
†Phleum pratense,	Meadow cats-tail,	June 13,	" "
Poa annua,	Annual meadow grass,	May 28,	L'm with grav'y subs'l
‡Poa pratensis,	Smooth-stalked m'dow grass,	June 11,	Dry calcareous loam.
Poa trivialis,	Rough-stalked m'dow grass,	June 18,	Calcareous loam.
Grass from a water meadow	First crop,	Apr. 30,	
do do	Second crop,	June 26,	
	Annual rye grass,	June 8,	Calcare's rubbly l'm.

*Orchard grass, U. S. † Timothy, Herds grass, of U. S. ‡Spire grass. June grass. Kentucky Blue grass, of U. S.

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TABLE II.—*Artificial Grasses.*

Botanical Names.	Common Name.	Date collection, 1849.	Nature of Soil.
Trifolium pratense,.....	Common red clover,.....	June 7,....	Forest marble tenacious loam.
Trifolium pratense perenne	Com'n purple trefoil or clover	" 4,....	Calcar's l'm or gravel.
Tifolium incarnatum,.....	Scarlet or Italian clover,....	" 4,....	Calcareous rubby l'm.
Trifolium medium,.....	Zigzag clover or cow grass,..	" 7,....	For't m'ble ten's l'm.
" 2d specimen,...	.....	" 21,....	Calcarous loam.
Trifolium procumbens,...	Hop trefoil,.....	" 13,....	Dry calcareous loam.
Trifolium repens,.....	White trefoil or Dutch clover	" 18,....	Forest marble loam.
Vicia sativa,.....	Common vetch,.....	" 13,....	" "
Vicia sepium,.....	Bush vetch,.....	" 9,...	Stiff for't m'rble clay.
Onobrychis sativa,.....	Sainfoin,.....	" 8,....	Dry rubbly loam.
Medicago sativa,.....	Purple medick or lucerne,..	" 16,....	" "
Medicago lupulina,.....	Black medick or nonsuch,..	" 6,....	Calcareous rubbly l'm
Plantago lanceolata,.. ..	Ribwort plantain, rib grass,	May 28,....	Calcareous clay.
Poterium sanguisorbia,..	Common salad burnet, ...	" 28,....	" "
Poterium millefoluim,....	Yarrow, ...	" 28,....	" "

"Table III. contains the analyses of the principal natural grasses. Column No. 1 gives the proportion of water; No. 2 the flesh-forming principles; No. 3 the fat-producing principles; No. 4, the heat-giving principles; No. 5, the woody matter; No. 6, the ash. To them is added a 7th column, of the date of collection, to facilitate a comparison of the latter, with the percentage of water.

TABLE III.—*Analyses of Natural Grasses,* (*in* 100 *parts of grass as removed from the field.*)

NAME OF PLANT.	1 Water.	2 Albuminous or flesh forming principle.	3 Fatty matters.	4 Heat producing principles, starch, gum, sugar, &c.	5 Woody fiber.	6 Mineral matter or ash.	7 Date of collection.
Anthoxanthum odoratum,	80.35	2.05	.67	8.54	7.15	1.24	May 25.
Alopecuris pratensis, ...	80.20	2.44	.52	8.59	6.70	1.55	June 1.
Arrhenatherum avenaceum	72.65	3.54	.87	11.21	9.37	2.36	July 17.
Avena flavescens,.....	60.40	2.96	1.04	18.66	14.22	2.72	June 29.
Avena pubescens,.....	61.50	3.07	.92	19.16	13.34	2.01	July 11.
Briza media,.....	51.85	2.93	1.45	22.60	17.00	4.17	June 29.
Bromus erectus,.....	59.57	3.78	1.35	.33	19.	2.11	" 23.
Bromus mollis,.....	76.62	4.05	.47	9.04	8.46	1.36	July 19.
Cynosurus cristatus,.....	62.73	4.13	1.32	19.64	9.80	2.38	June 20.
Dactylis glomerata, ...	70.00	4.06	.94	13.30	10.11	1.59	" 13.
do seeds ripe,.....	52.57	10.93	.74	12.61	20.54	2.61	July 19.
Festuca duriuscula,.....	69.33	3.70	1.02	12.46	11.83	1.66	June 13.
Holcus lanatus,.....	69.70	3.49	1.02	11.92	11.94	1.93	" 29.
Hordeum pratense,.....	58.85	4 59	.94	20.05	13.03	2.54	July 11.
Lolium perenne,.....	71.43	3.37	.91	12.08	10.06	2.15	June 8.
Lolium italicum,.....	75.61	2.45	.80	14.11	4.82	2.21	" 13.
Phleum pratense,.....	57.21	4.86	1.50	22.85	11.32	2.26	" "
Poa annua,.....	79.14	2.47	.71	10.79	6.30	.59	May 28.
Poa pratensis,.....	67.14	3.41	.86	14.15	12.49	1.95	June 11.
Poa trivialis,.....	73.60	2.58	.97	10.54	10.11	2.20	" 18.
Grass from water meadow,	87.58	3.22	.81	3.98	3.13	1.28	April 30.
do second crop,'..	74.53	2.78	.52	11.17	8.76	2.24	June 26.
Annual rye grass,.....	69.00	2.96	.69	12.89	12.47	1.99	" 8.

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"The first column of this table exhibits numbers which differ very much from each other. Whilst in some cases the percentage of water is as high as 80, in others it only amounts to 60; in one instance (Briza media) being as low as 51—(the second sample of Dactylis glomerata, which was fully ripe is excepted.)

"The proportion of water is evidently connected with the period at which the grass comes into flower, the earliest grasses being generally the most succulent, although a careful examination of the table will show that this is not always the case. Thus the specimens Briza media, and Holcus lanatus, both gathered on the 29th of June, contain respectively in round numbers 52 and 70 per cent. of water.

"The proportion of water in a plant becomes interesting chiefly when it is considered as influencing the proportion of dry matter or actual feeding material of the plant. Thus, for instance, the quantity of dry or solid matter in 100 parts of Anthoxanthum odoratum or Alopecurus pratensis is 20 parts; whilst in Avena flavescens or pubescens it reaches as much as 39 or 40 parts. The immediate interest of this circumstance to the farmer is, that in judging of the quantity of hay which will be produced from a meadow, he must take into account the nature of the grasses composing it, since it is plain that in the instances mentioned a given weight of one kind of grass will produce twice as much hay as another.

"In looking down the columns of this table, especially Nos. 1, 2, 3 and 4, which are most important, very great differences will be seen; the albuminous matters, for instance, being in some cases double what they are in others. In some instances these are differences really in the proportion of the various principles in relation to each other; but an apparent variation is very often produced by the greater or less amount of water contained in the plant. Such differences are real so far as the comparison of the fresh-cut grass is concerned, but they in many cases cease to exist when the grasses being made into hay, are carried to the same point of dryness.

"I believe this latter to be the most important point of view, both practically and scientifically, and I shall therefore reserve any further remarks on this head, until the composition of the dry grasses is before us.

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"The table which follows gives the analyses of the artificial grasses and clovers, as taken from the field.

TABLE IV.—*Analyses of Artificial Grasses, (in 100 parts as taken from the field.)*

NAME OF PLANTS.	1 Water.	2 Albuminous or flesh forming principle.	3 Fatty matters.	4 Heat producing principles, starch, sugar, gum, &c.	5 Woody fiber.	6 Mineral matter or ash.	7 Date of collection.
Trifolium pratense,.....	81.01	4.27	.69	8.45	3.76	1.82	June 7.
Trifolium pratense perenne	81.05	3.64	.78	8.04	4.91	1.58	" 4.
Trifolium incarnatum,....	82.14	2.96	.67	6.70	5.78	1.75	" 4.
Trifolium medium,.....	74.10	6.30	.92	9.42	6.25	3.01	" 7.
" 2d specimen,...	77.57	4.22	1.07	11.14	4.23	1.77	" 21.
Trifolium procumbens,....	83.48	3.39	.77	7.25	3.74	1.37	" 13.
Trifolium repens, ...	79.71	3.80	.89	8.14	5.38	2.08	" 18.
Vicia sativa,...	82.90	4.04	.52	6.75	4.68	1.11	" 13.
Vicia sepium,..	79.90	4.64	.58	6.66	6.24	1.98	" 9.
Onobrychis sativa,.....	76.64	4.32	.70	10.73	5.77	1.84	" 8.
Medicago lupulina,.....	76 80	5.70	.94	7.73	6.32	2.51	" 6.
Plantago lanceolata,.....	84.75	2.18	.56	6.06	5.10	1.35	May 28.
Poterium sanguisorbia,...	85.56	2.42	.58	6.85	3.44	1.15	" 28.
Medicago sativa,.....	69.95	3.83	.82	13.62	8.74	3.04	June 16.

"The percentage of water in these grasses is, on the average, higher than in the natural grasses; but, in spite of this circumstance, the column appropriated to albuminous matters exhibits numbers which exceed very considerably those in the previous table. In other words, weight for weight, even when fresh cut, the "artificial" grasses contain a much larger proportion of flesh-forming principles. How much this difference is increased when the samples are compared in the state of hay will be seen when we give the numbers which represent the composition of the various grasses when dry.

"The tables V. and VI. which follow give the composition of the whole series after drying at 212° Fahrenheit, until all the moisture of the grass is expelled.

"There are many points of great interest brought out by these tables, and I might perhaps be pardoned for employing the numbers they contain as tending to confirm or refute some of the most important doctrines extant on the subject, both of vegetable and animal nutrition. This, however, is not my object; I look upon these analyses as an addition to our previous knowledge—a contribution in fact, to the data upon which all philosophical

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reasoning should be built; but whilst I should of course be the last to under-rate their value, I do not consider that such data are sufficient in themselves to settle the controverted points; and indeed, however much may be the labor and time bestowed upon them, one such set of results is inadequate to convince us that very considerable variations in composition might not be found in the same plants, under different circumstances of soil and climate. But at the same time, whilst the trifling differences in composition between specimens of one and another kind of grass, as shown in these tables, will not be insisted upon, we have fairly a right to call attention to those broad lines of distinction which are to be found there. I shall, however, do this very shortly, leaving to the reader, who cares to do so, to study for himself the results which I have obtained, and to see how far they agree with his practical experience of the feeding and fattening value of the different grasses examined.

TABLE V.—*Analyses of Natural Grasses, (in* 100 *parts of the grass, dried at* 212°, *Fahrenheit.)*

NAME OF PLANTS.	2 Albuminous or flesh-forming principle.	3 Fatty matter.	4 Heat-producing principles, starch gum, sugar, &c.	5 Woody fiber.	6 Mineral matter or ash.
Anthoxanthum odoratum,.....	10.43	3 41	43.48	36.36	6.32
Alopecurus pratensis,.....	12.32	2.92	43.12	33.83	7.81
Arrenatherum avenaceum, ...	12.95	3.19	38.03	34.24	11.59
Avena flavescens,.....	7.48	2.61	47.08	35.95	6.88
Avena pubescens,.....	7.97	2.39	49.78	34.64	5.22
Brisa media,.....	6.08	3.01	46.95	35.30	8.66
Bromus erectus,.....	9.44	3.33	32 02		5.21
Bromus mollis.....	17.29	2.11	38.66	36.12	5.82
Cynosurus cristatus,.....	11.08	3.54	52.64	26.36	6.38
Dactylis glomerata,..	13.53	3.14	44.32	33.70	5.31
" seeds ripe,.....	23.08	1.56	26.53	43.32	5.51
Festuca duriuscula, ...	12.10	3.34	40.43	38.71	5.42
Holcus lanatus,.	11.52	3.56	39.25	39.30	6.37
Hordeum pratense,.....	11.17	2.30	46.68	31.67	6.18
Lolium perenne,..... ...	11.85	3.17	42.24	35.20	7.54
Lolium italicum,.....	10.10	3.27	57.82	19.76	9.05
Phleum pratense.....	11.36	3.55	53.35	26.46	5.28
Poa annua,.....	11.88	3.42	51.70	30.22	2.83
Poa pratensis,.....	10.35	2.63	43.06	38.02	5.94
Poa trivialis,.....	9.80	3.67	40.17	38 03	8.33
Grass from water meadow,.....	25.91	6.53	32.05	25.14	10.37
" second crop,.....	10.92	2.06	43.90	34.30	8.82

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TABLE VI.—Analyses of Artificial grasses, (in 100 parts of the grass dried at 212° Fahr.)

NAME OF PLANTS.	2 Albuminous or flesh forming principles.	3 Fatty matters.	4 Heat producing principles, starch, gum, sugar, &c.	5 Woody fiber.	6 Mineral matter or ash.
Trifolium pratense,	22.55	3.67	44.47	19.75	9.56
Trifolium pratense perenne,	19.18	4.09	42.42	25.96	8.35
Trifolium incarnatum,	16.60	3.73	37.50	32.39	9.78
Trifolium medium,	24.33	3.57	36.36	24.14	11.60
do 2d specimen,	18.77	4.77	49.65	18.84	7.97
Trifolium procumbens,	20.48	4.67	43.86	22.66	8.33
Trifolium repens,	18.76	4.38	40.04	26.53	10.29
Vicia sativa,	23.61	3.06	39.45	27.38	6.50
Vicia sepium,	23.08	2.88	33.15	31.04	9.85
Onobrychis sativa,	18.45	3.01	45.96	24.71	7.87
Medicago lupulina,	24.60	4.06	33.31	27.19	10.84
Plantago lanceolata,	14.29	3.67	40.29	33.07	8.68
Poterium sanguisorbia,	16.75	4.01	47.40	23.87	7.97
Achillea millefolium,	10.34	2.51	45.46	32.69	9.00
Medicago sativa,	12.76	2.76	40.16	34.21	10.11

"The two last tables give the composition of the grasses in a dry state. The numbers must therefore be somewhat modified for them when in the state of hay; for however dry it may appear, no grass can be made absolutely dry without artificial heat. The usual proportion of moisture in well-made hay, I believe to be about 16 per cent.; and a grass that has been dried artificially, will in the open air acquire about this degree of moisture. It would have occupied space unnecessarily to have given the numbers which would apply to the grasses in the state of hay, and the calculation can be easily made by those who care for it; from the percentage of albuminous or fatty matter in the dry specimen, about one-sixth is to be deducted to ascertain the quantity present in the hay. The numbers however, are strictly comparable with each other.

"We will first advert to table V—that of the natural grasses in the dry state—leaving out of the question for the present the water-meadow grass and the Dactylis glomerata, of which the seeds are ripened. We find the following numbers to represent the lowest, highest, and average quantities per cent. of the different principles in the specimens of natural grasses examined:

	Lowest.	Highest.	Average.
Flesh-forming principles,	6.08	17.29	10.98
Fat-producing "	2.11	3.67	3.08
Heat-giving "	38.03	57.82	45.57

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"These differences are very great, and if composition influences feeding properties, as it must as certainly as effect of any kind follows cause, the value of the different grasses must be very variable. I would, however, guard the farmer, who has a practical acquaintance with this matter, from judging hastily that the theoretical equivalents of nutritive value here shown, are not in accordance with experience. It is well to remember that many of those grasses, which are highly valued, are so valued not because of their intrinsic worth as feeding agents, but because they present themselves at a time when they are very much wanted—that is to say, in early spring. The most remarkable specimens in this table are the water-meadow grass, (first crop), and the Dactylis glomerata, (with seeds ripe). Both in the quantity of nitrogen and fatty matters the water-meadow grass nearly doubles the other grasses in the Table. This meadow was composed principally of the grasses Poa trivialis, Holcus lanatus, Hordeum pratense, Avena pratensis, Lolium perenne, &c., in none of which do we see the peculiarity which unitedly they show in this meadow. Are we to attribute the high proportions of fat and flesh-forming principles to the action of the water in irrigation? If so, we have indeed in it a most important and powerful agent. The other instance named (the Dactylis glomerata), shows us how large a proportion of nitrogen is accumulated in the plant as it progresses to maturity; and whatever view we may take of this circumstance in relation to the nutritive properties of this plant, we cannot doubt that it is then that the soil most suffers from the drain which is made upon it.

"The Italian rye-grass (Lolium italicum) is remarkable for the small quantity of useless matter, (woody fiber), the large proportion of soluble carbonaceous matter, (starch, gum, &c.), and the moderate proportion of albuminous constituents. From the well known value of Italian rye-grass the composition is a matter of interest.

"Table VI.—In these, the Artificial grasses, we find the proportion of the different principles varying to the following extent:

	Lowest.	Highest.	Average.
Flesh-forming principles,.....	10.34	24.60	19.03
Fat-producing "	2.51	4.77	3.65
Heat-giving "	33.15	49.65	41.29

"The chief peculiarties of this series, in comparison with those of the natural grasses, consist in the much higher proportion (in

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many cases more than double) of albuminous matters, and of a certain, though less evident, advantage in the quantity of fatty matters; whilst the heat-giving principles remaining nearly the same, the quantity of woody matter is necessarily much reduced. As a proof of the high value which theoretically we should place upon the artificial grasses, I may remark that in the dry state they equal peas or beans in nitrogenous matter, and considerably excel them in the proportion of fatty matter.

"I will take leave of these tables by remarking that, if the view which gives a prominent value, for feeding purposes, to albuminous matters in large proportion over the non-nitrogenous portions of plants be correct, the "artificial" are far more nutritive than the natural grasses. But, as I before said, these results were not intended as a peg to hang an argument upon, either on one side or the other, and for the present I am content to offer them as a contribution to the Chemistry of Vegetation, without further argument or deduction.

"The following are analyses of a few weeds:

TABLE VII.—On the specimens as collected.

NAME OF PLANTS.	Water.	Albuminous matter.	Fatty matter.	Heat producing principles.	Woody fiber.	Ash.	Date of collection.
Centaurea nigra, (black knapweed),	69.05	3.03	.641	14.28	10.84	2.16	July 24.
Crysanthemum leucanthemum, (ox-eye daisy),	71.85	2.12	.999	12.64	10.51	1.86	June 23.
Juncus glaucus, (rushes),	64.05	2.38	1.121	16.48	13.82	2.15	July 11.
Papaver rhœas, (common red poppy),	81.00	1.71	.883	7.20	6.08	3.13	" 2.
Ranunculus acris, (butter cups),	88.15	1.18	.507	6.26	3.00	.91	June 13.
Rumex acetosa, (field sorrel),	75.37	1.90	.545	7.62	13.04	1.51	July 4.
Sinapis arvensis, (field mustard),	85.31	1.93	.393	6.95	4.40	1.02	June 29.

TABLE VIII.—On the dry Specimens.

NAME OF PLANTS.	Albuminous matter.	Fatty matter.	Heat producing principles.	Woody fiber.	Ash.
Centaurea nigra,	9.79	2.07	46.09	35.04	7.01
Crysanthemum leucanthemum,	7.53	3.49	45.02	37.33	6.63
Juncus glaucus,	6 61	3.12	45.81	38.46	6.00
Papaver rhœas,	9.02	4.65	41.43	28.71	16.49
Ranunculus acris,	9.98	4.28	52.69	25.34	7.71
Rumex acetosa,	7.71	2.19	46.82	37.16	6.12
Sinapis arvensis,	13.03	2.67	47.30	30.00	7.00

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"On the whole, these weeds contain less nitrogen than the useful grasses—a circumstance which may in part account for the rapidity with which they spring up, even in poor soils, and the difficulty of eradicating them.

"The numbers in Table IX, were obtained in the estimation of the nitrogen and fatty matters of the grasses in each instance where a second analysis was made.

TABLE IX.—*On the dried specimens.*

NAME OF PLANTS.	Nitrogen.			Oil.		
	1st. Determination	2d. Determination	Mean.	1st. Determination	2d. Determination	Mean.
Trifolium pratense perenne,.....	3.022	3.019	3.020	4.088	4.096	4.092
Trifolium incarnatum	2.628	2.582	2.615	3.736	3.724	3.730
Trifolium medium,.....	3.857	3.813	3.835	3.577	3.555	3.566
Trifolium procumbens,.....	3.188	3.268	3.228	4.716	4.617	4.666
Trifolium pratense, ...	3.602	3.500	3.551	3.632	3.710	3.671
Trifolium repens, ...	2.937	2.967	2.952	3.811	4.013	3.912
Trifolium medium, 2d specimen,..	3.002	2.916	2.959	4.491	5.044	4 768
Vicia sativa, ...	3.752	3.690	3.721	3.102	3.029	3.065
Medicago lupulina, ...	3.891	3.860	3.876	4.011	4.110	4.060
Vicia sepium,.....	3.644	3.634	3.639	2.800	2.990	2.895
Anthoxanthum odoratum,.....	1.680	1.610	1.645	3.430	3.400	3.415
Poterium sanguisorbia,.....	2.840	2.454	2.647	3.870	4.114	3.992
Plantago lanceolata,.....	2.300	2.200	2.250	3.700	3.670	3.685
Alopecurus pratensis, ...	1.943	1.940	1.941	2.675	2.620	2.647
Poa annua,.....	1.839	1.890	1.864	3.412	3.425	3.418
*Poa pratensis.....	1.633	1.634	1.633	2.659	2.596	2.627
Annual rye grass,.	1.505	1.500	1.502	2.460	2.000	2.230
Poa trivialis, ...	1·508	1.580	1.544	3.664	3.668	3.666
Onobrychis sativa, ...	2.872	2.942	2.907	3.087	2.930	3.008
Avena pubescens,.....	1.265	1.250	1.257	2.294	2.467	2.380
Bromus mollis,.....	2.710	2.740	2.725	2.144	2.090	2 112
†Dactylis glomerata,.....	2.100	2.168	2.134	3.289	3.000	3.144
do seeds ripe,.....	3.538	3.734	3.636	1.545	1.573	1.564
Lolium perenne,.....	1.880	1.850	1.865	3.233	3.108	3.170
Festuca duriuscula,.....	1.924	1.895	1.909	3.166	3.511	3.338
Arrhenatherum avenaceum,.....	2.005	2.075	2.040	3.165	3.219	3.192
Lolium italicum,.....	1.613	1.571	1.592	3.064	3.472	3.273
Cynosurus cristatus,.....	1.842	1.647	1.744	3.585	3.500	3.542
Chrysanthemum leucanthemum,...	1.180	1.192	1.186	3.283	3.714	3.498
Briza media,.....	1.014	.900	.957	3.046	2.970	3.008
Avena flavescens, ...	1.186	1.170	1.178	2.546	2.680	2.613
Holcus lanatus,.....	1.818	1.813	1.815	3.367	3.710	3.359
Rumex acetosa, ...	1.235	1.192	1.213	2.035	2.357	2.196
Sinapis arvensis, ...	2.080	2.113	2.051	2.627	2.728	2.677
Bromus erectus,.....	1.488	1.465	1.476	3.425	3.129	3 327

* Timothy, or Herds Grass. † Orchard Grass.

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BUTTER.

REPORT OF COMMITTEE AT WATERTOWN.

The Committee would respectfully report that they have performed their difficult and laborious task, and that they have carefully examined all the butter offered, which was some 70 packages, being many more than has been presented for many years, and perhaps the most ever presented at any fair since the formation of the Society. The Committee found great difficulty in deciding on the merits of the different packages, but have done so according to the best of their judgment. They regret that they were limited in so few premiums, as many of the samples were first rate; and only by a very close examination, after bringing all the packages to a certain standard and reducing the number to about 12 or 15 as extra No. 1, and then re-examining and finally awarding the premiums.

We would especially notice a jar of 10 lbs. of butter, made by a Miss A. O. Bent, 10 years of age, of Sterling, Cayuga county, from the milk of a yearling heifer, commencing on the 2d day of August and ending on the 5th day of September. The Committee, after examining the butter and finding it of fair quality, think that she is deserving of great praise, and further to encourage others hereafter to habits of industry, feel at liberty to award her a silver cup, and by so doing hope to encourage her and others to try again, and take the Society's first premiums.

M. M. SMITH, Lewis Co.
R. P. BENTON, Boston, Mass.
Committee.

STATEMENTS REQUIRED OF COMPETITORS FOR BUTTER PREMIUMS.

1. At what time was butter made, and from what number of cows?
2. What is the treatment of cream and milk before churning, in winter and summer—and why?
3. What is the method of freeing the butter from milk?
4. Do you use water in freeing the butter, or not—and why?
5. What quantity of salt per pound, and the kind of salt used?
6. Do you use saltpeter or any other substance in making the butter—and why?

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7. Has any kind of salt been found injurious in making butter?—if so, state the kind and reasons.
8. What is the manner of packing and preserving the butter?

B. S. CARPENTER,—Elmira.

MANNER OF MAKING BUTTER.

Yield of five cows in thirty consecutive days—(*1st Premium.*)

In complying with the rules of the Society, I submit the following method of our butter making: The milk when drawn is strained into tin pails holding 12 quarts each, and set on the bottom of our cellar, which is a water-lime cement, where it remains until it becomes loppered. It is then, both milk and cream, poured into churns which hold a barrel each, a pailful of water to six of milk added, and the whole brought to a temperature of 68°. The churning is done by horse power, and requires about two hours. Just before the butter has fully come, another pailful or two of water to six of milk is put into each churn to thin the buttermilk, so that the butter may rise freely. The butter is taken from the churn into large wooden bowls, thoroughly washed with cold water, and salted with about one ounce of Ashton salt to a pound of butter, and lightly worked through with a common ladle. It is afterward worked at intervals of about three hours, for four or five times, with a common ladle, and packed into firkins, the next morning.

The firkins are filled within an inch or so of the top, a thin cloth spread over the butter and that covered with salt and brine through the whole season. When the weather becomes cool, to hasten the thickening of the milk, we leave a quart or two of buttermilk in each pail when the milk is strained.

The butter from five cows, of which I offer a sample of 27 lbs., was made in strict conformity to the foregoing statement, during the month of June; the sample was made during the last week of June. The cows were fed on pasture alone, no roots, grain or slops of any description used. The cows were all owned by me previous to the first of February, 1856. The milk from them on the second of June weighed 231 lbs., measured 115½ quarts. The cows are natives, with a light mixture of Durham blood.

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The whole amount of butter made in 30 consecutive days was 252 pounds.

ANSWERS TO THE QUESTIONS ASKED.

1st and 2d. Answered above.

3d and 4th. We use water to thin the buttermilk, so that the particles of butter will rise to the surface.

5th. Answered above.

6th. We do not use saltpeter or any other substances in making butter. We have always used the Ashton factory filled salt.

8. Answered before.

HENRY N. KIMBALL,—RUTLAND, JEFFERSON CO.

MANNER OF MAKING BUTTER.

1st Premium for 50 lbs. made at any time during the season.

ANSWERS TO THE QUESTIONS PROPOSED.

1st. Butter was made in September, from 15 cows.

2d. Milk is placed in a well ventilated room, with as much surface exposed to the north as possible; the rest shaded so as to keep cool—is warmed in fall and winter by means of stove. The cream is taken off as soon as the milk becomes thick, and sometimes before; it should be taken off before any specks show themselves on the cream. The cream is kept at about 56° or 58° by means of coolers suspended in the well. Milk should be closely watched and not let the cream stand too long, as it injures the quality of the butter.

3d. The butter is rinsed with cold water.

4th. Water is used as being the best and most expeditious way of freeing it of milk; and good butter, I think, cannot surely be produced in hot weather without the use of water.

5th. We use the Ashton salt, three-quarters of an ounce to the pound, or rock salt.

6th. Use no saltpeter, as I think it does no good.

7th. I think the Syracuse salt injurious, as there seems to be an earthy substance that does not dissolve readily, and it shows itself in small scales on the butter.

8th. We pack the butter in shaved ash tubs, made from heart stuff; as all sap timber in the tub will soak the brine and become

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moldy. Pack as solid as possible and cover with a cloth and a thick coat of salt, and exclude from the air as much as possible. The cows are native stock, with no extra feeding.

M. G. & G. H. NORTON,—Gouverneur, St. Lawrence Co.

MANNER OF MAKING BUTTER.—(*Hard water used.*)

Agreeable to the rules of the Society we answer the questions proposed.

1st. From the 20th to the 30th of September inst., and from 13 cows and heifers of improved breed, and fed on grass only.

2d. In the summer, if the heat of the weather requires it, ice is kept in the strainer pail while straining. The milk is allowed to stand in tin pans in the milk-house till thick; the cream is then skimmed into stone jars and allowed to stand in a cool cellar, being occasionally stirred till a sufficient quantity accumulates, it is then churned with a dash churn, by dog power, ice being added if necessary. In the winter the treatment is the same, except the milk-house is warmed by a stove, and the cream is warmed in the jars by the stove before churning.

3d and 4th. The butter, on being taken from the churn with a ladle, is washed *with hard water* as long as it is tinged with the milk; because we think it the best way to free it from the milk and "white caps," or particles of dried cream caused by too much air.

5th, 6th and 7th. The butter after being washed, is salted with ground rock salt, five and a half pounds in winter, spring and fall, and seven and a half pounds of salt to one hundred pounds of butter that is to stand in the cellar through the summer; but we use no other substance except ground rock salt, and that we have never found injurious in making our butter.

8th. The next morning, after being salted, the butter is worked on an oak worker, and packed in oak firkins or ash tubs with ash or oak covers. We always reject basswood covers as they injure the butter to the depth of four to six inches. The firkins preserve the butter best in going to market, as they entirely exclude the air and dust; the tubs are most convenient for customers. Our cows came in from the 18th of March to the 20th of June, and we have made and packed from them thirteen hun-

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dred and fifty pounds of butter, exclusive of the milk and butter used in a family of seven persons. We send our winter and spring made butter to market up to about the first of May; the remainder in the fall. We have for the last four years consigned our butter to A. H. Hovey, formerly a commission merchant of Boston, who has supplied his own table and those of individual families with it; and being now located at Grand Rapids, Mich., has ordered some three 50 lbs. packages via. Chicago, for his own use.

D. MINTHORNE'S

IMPROVED METHOD OF MAKING BUTTER.

Water and Buttermilk removed by Solar Evaporation.

This butter is made by my improved method, whereby every drop of water or buttermilk is taken out of it by solar evaporation. In this process, I claim to have so perfected butter making that butter may be kept sweet several years, without the rancid odor caused by the decomposition of water and buttermilk that pervades most of the butter at the present time. The following is an outline of my improved process: Firstly—in churning the cream, enough ice should be put into it, occasionally, to make the butter come in crumbs—pour off the buttermilk and wash the butter several times in soft ice water, till there ceases to be any milky appearance. During the process of washing, should there be a solid lump of butter large enough to contain a cell of fluid, that lump should be crushed while in the water, and broken into a corresponding size of the other crumbs.

Lastly—Wash it in brine made of rock salt, saltpeter, *soft* water and ice— kim the crumbs out of the brine with a skimmer —drain each skimmer-full well and spread the crumbs of butter on zinc plates. (In cool weather wooden tables will do instead of the zinc.) In very hot weather these zinc plates should set on ice water while the crumbs are spread out thinly. Place the butter in the middle of a milk room—open all the windows, and a current of air passing over it will evaporate all the moisture in less than an hour in warm weather, if the room is suitably ventilated. Care should be taken not to have any other moisture in the room, like water on the floor, or wet dairy furniture. When

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the butter is perfectly dry, pack it down immediately, and let there be no more working of it than is necessary to pack it solid in a jar or tub. This will secure unbroken the crystals of butter and its original flavor. As near as I can ascertain, there will not exceed one ounce of salt to ten pounds of butter by the process of brine salting; but, as a general thing, butter made for hospitals, rich, gouty invalids and sick persons, the salting process should be omitted altogether. Butter made in this way, (without salt,) if sealed in cans or jars, and placed in an atmosphere or chamber of binoxide of nitrogen, I believe will keep any practical number of years.

I have also an improved butter tub which I hoped to be able to present you, but sickness has prevented me this year. It is a butter tub (turned) in halves, opening in the middle like a match box (circular tenon,) made of ordinary porous wood, kiln dried; then placed in an air chamber, and after exhausting the air, inject a solution of stone, which, by atmospheric pressure, will penetrate the pores of the wood, and becomes petrified and coated with stone, without increasing the weight of the package over six or eight per cent. The tub will be air tight and possess all the qualities of a stone jar.

BUTTER—DAIRY COWS.—CORTLAND COUNTY.

AVERAGE PER COW.

Enoch Willet, of Virgil made from 11 cows, from 1st of April to 1st of December, 2021 lbs. butter for sale, and 200 lbs. used in family—an average of $201\frac{11}{16}$ lbs per cow.

George Miller, of Cortlandville, made from 17 cows 3323 lbs. —an average of $195\frac{9}{16}$ lbs. per cow.

ON THE PHILOSOPHY OF MAKING BUTTER.

BY S. EDWARDS TODD, TOMPKINS CO.

Butter, of a first rate quality, is an article which cannot be made without a vast deal of care and order and cleanliness, brought to a regular system. The food of the cows which give the milk, of which the butter is made—the regularity and irregularity of milking—the management of the milk, while the cream is

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rising—the temperature and treatment of the cream before it is churned—the temperature of cream when it is churned—the churning and the working and salting of the butter—all have a very important influence in making excellent butter. Where proper regard is not paid to the *circumstances* and *causes* which have a very important influence in making butter, the product will often be an unctuous compound, but little better than good soap grease. Making butter, for the most part, is a *chemical* process; some parts are purely mechanical.

Milk.—The milk of cows is composed of three distinct ingredients: the *curd*, the *whey* and the *butter*. The union of these ingredients is not *chemical*, but a *mechanical* union. The curd is the heaviest part of the milk, and the butter the lightest; consequently, when the milk is allowed to stand undisturbed, for a short time, the butter begins to rise to the surface, in the form of cream. As soon as the milk is drawn from the cow, the atmosphere begins to affect it, more or less, according to its temperature. The milk is strained into shallow vessels, which are better than deep vessels, and allowed to stand undisturbed, until the cream has all risen to the surface. On account of the changes, produced by the different states of the atmosphere, it is impossible to lay down a rule, to regulate the length of time that milk should stand, before the cream is taken off from the milk. In order to have the cream rise well, the milk should be set in a cool and airy place, where the temperature is not too high, nor too low, and where it is not exposed to an atmosphere too highly charged with aqueous vapor. The judicious butter-maker will be able to discern, by the appearance of the cream, when it has stood long enough; and, as soon as it has reached that point, the cream should be taken off, without any delay. There is a point when the cream ceases to rise; and sometimes the chemical changes take place so rapidly, at such points, that every moment which the milk is allowed to stand with the cream on, greatly affects the *quality* and *quantity* of butter, which is contained in a given quantity of milk.

After the cream is skimmed from the milk, it should be kept in a cool place, in a vessel which has a cover fitting tight, in order to exclude the air as much as possible. If left in an open vessel, with a broad surface, much of the cream will be injured

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by exposure to the atmosphere, even if it should stand but a few hours. In very hot weather, ice should be put into the cream, to keep the temperature below 65° Fahrenheit; it being far better for the butter to keep the temperature below this point, than it is to allow it to rise to 70° or 80°, until the cream is to be churned, and then to bring the temperature down to the degree desired. The care which the cream receives is the most important consideration in the whole process of making butter. If milk is not kept in a good place, where the cream will rise well —if the milk is not skimmed at the proper time—and, if the cream is not well taken care of after it is skimmed, we may have the best cows, the best churn, and the best worker in America, but will not be able to make good butter. There are many considerations, of no small importance in making butter, of which we cannot now speak; and for the sake of brevity we pass to

Churning.—The butter contained in cream is enveloped in little sacks of curd; and the grand object of churning cream is, to liberate these little globules of butter by opening the sacks. This we cannot do by simple mechanical means. The cream must be of a temperature which, when exposed to the air, will so affect these little sacks as to make them crack open and allow the globules of butter to escape. If the cream be too warm, or too cold, the butter will not come. "At 40° Fahrenheit, you might churn from January to March, or, at 100°, you might churn from June to September, and no butter would come. Or, if you were to exclude the air entirely from the inside of the churn, you might roll that churn, with the cream in it, from Cape Horn to Labrador, and the butter would not come. There is a certain degree of temperature, at which, if the cream is churned, it will yield the best and the most butter. Repeated and well conducted experiments of the best dairymen, have shown that degree of temperature to be about 65° Fahrenheit. It would seem that if the cream were churned at a temperature when the butter would come in the very shortest period of time, that would be the temperature to have the cream when it is being churned. But experiment has decided this not to be the fact. By churning when the temperature of the cream is as high as it can be, and allow the butter to come, the butter will be very soft and much inferior to butter that is churned at about 65°. By churning when the

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temperature of the cream is as *low* as it can be, and the butter come, it will require a long time to churn; and the cream will not yield so much butter, nor will it be as good. Many people churn for three hours in succession, and then wonder why their butter is so poor. Many leave their milk unskimmed until the cream has undergone such a chemical change as to render it almost unfit for making butter; and then denounce their cows, or something else, because their butter is so entirely destitute of that excellent flavor which they discover in the butter of a friend or neighbor. Some, when churning, are incessantly pouring into the cream hot water or cold water, as the case may seem to require, and, before they are aware of it, they many times raise the temperature of the whole mass so high that they never could get any butter, unless the temperature were reduced. How can any one expect to have good butter when they set at nought all the rules by which an excellent butter maker is guided; and skim their milk when it is most convenient; and churn when it will not interfere with their other duties; and have the cream of that temperature which will aid the butter in coming in the very shortest time?

Our best butter makers, during the warmest weather, consider good ice an indispensable article, in regulating the temperature of the cream; and those whose dairy houses or cellars, where the cream is kept, will not keep the temperature of the cream below 65°, will find it very much to their advantage and interest to use ice in their cream. A good thermometer is a very useful instrument in making butter, and they who have once become accustomed to the advantages of one, do not know how to dispense with its use. Great care must be exercised in raising the temperature of the cream, lest it gets many degrees above the desired point, before we are aware of it. Fresh air is another very important consideration in churning. The churn lid should be removed often, in order to allow fresh air to come in contact with the cream. If the churn could be open while churning, the butter would come much more evenly. Butter making is a nice business; and if the butter maker has no habits of neatness, and is deficient in *order* and in being *particular*, in what many call "*little things*," she or he may forever despair of making butter of a first rate quality.

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Working Butter is a part of butter making, which is generally very imperfectly understood. After the butter has come, the whole mass holds more or less buttermilk mechanically, in large globules, which must be got out, in order to preserve the butter. Were it not for this buttermilk, butter would need no working; therefore, working butter is a purely mechanical operation, and any process or machine, which will liberate the buttermilk, by working over the butter the least is the best. Submitting a clump of butter to a powerful pressure, will by no means force out the buttermilk, even if it is hard or soft, or only very pliable. It is always very difficult to get the buttermilk all out, when butter is very soft or very hard. Working butter by passing a roller over it, is by no means a good and economical way of getting out the buttermilk. Passing it between corrugated or fluted rollers, by which it is crushed, mashed, or flattened out, is a very slow process of getting out the buttermilk, and before it can all be thoroughly worked out by such a process, the flavor of the butter will certainly be injured, more or less. Working butter with the bare hands, as thousands do, is the most *laborious and injurious* mode, and those who practice it always complain most bitterly, of the very great expenditure of strength, in working only a little mass. The hands and fingers are very inefficient and impotent instruments to press or squeeze anything with, because, in them we cannot avail ourselves of any mechanical advantage. A far more economical mode would be, where the bare hands are used, to mount on it with the bare feet. This would be no more sordid, nor ridiculous, than working it with the hands. By melting butter, only a little, we destroy its excellent flavor, and render it adhesive and salvy; and as the hands are warm enough to melt butter, it cannot be worked with them without injuring it, more or less; and if good butter can be made by working with the hands or feet, or a rolling press, we may rest assured that by using a good worker for getting out the milk, butter of a very superior quality may be made. Working butter with a ladle is the true and philosophical mode of getting out the milk, but it is a very laborious and slow process, and requires the expenditure of a vast amount of *unnecessary* strength; because we are not able, with a ladle, to avail ourseves of any mechanical advantage, neither in gashing the butter nor in pressing it. Since the grand object of

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working butter is to get out the buttermilk, which is held *mechanically* in the mass, common-sense philosophy teaches us to make long, deep gashes in the mass, into which the buttermilk may readily flow, and, as it is very difficult to force the buttermilk into the butter again, when it has once been liberated, we have only to gash the mass, and then close these gashes by a gentle pressure, by which all the buttermilk in those gashes will be forced out. With these remarks we will introduce a cut and description of

THE AMERICAN BUTTER WORKER.

This worker consists of a square box, about two feet long, and one foot nine inches wide, and one foot one inch deep, standing on legs. On the inside of the box, on one side, is a system of wooden knives for gashing the butter. Directly below these knives is a groove across the bottom of the worker, and little holes in this groove through which the buttermilk escapes into an apartment between the first and second bottom, and is received in a vessel under the worker. A corrugated or sharp ridged presser, standing at an angle of about 40°, is suspended near one side of the box, on the inside, which is made to move freely towards and from the knives by means of a compound lever. The construction is such that the leverage and mechanical advantage increase as the handle or working lever is brought down, thus thrusting the presser towards the knives with an increased force.

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The butter is put into the machine as soon as it is churned, and pressed against the knives. When the presser is withdrawn, as the butter stands on a very narrow base, it falls down towards the presser, and a different surface is presented to both the presser and the knives. The mass of butter revolves in the worker like rolling over a four-square stick of timber; and the salt can be worked in at the same time of working out the buttermilk, most thoroughly and evenly; and, if it is desirable to wash the butter, (which practice we do not approve,) a stream of water may be kept pouring on the butter during the process of working, which will all flow readily into the vessel which receives the buttermilk.

The excellence and advantages of this worker, over all others in our knowledge are, that it works all that is put into the worker at once, very evenly. One part cannot remain unworked, while another portion is worked over, several times. It works very rapidly. The machine is warranted to work, with ease to the operator, one hundred pounds of butter, in the most thorough and neat manner, in fifteen minutes. It works butter on principles strictly philosophical. The mass is gashed, and then the buttermilk flows into these gashes, and when they are closed by pressing the buttermilk escapes. A female of ordinary strength, who is accustomed to spend from two to three hours in working a given amount of butter with a ladle, taxing all her energies, can work and salt that butter with one of these workers, with nine-tenths less fatigue, and in less than ten minutes. We know it to be a great labor-saving machine; and a complete remedy for a female's lame hands, lame arms and shoulders, which have been made so by working butter.

This machine was patented by E. J. Dickey, Hopewell Cotton works, Chester county, Penn., where they have come into general use. There are three sizes of workers. No. 1 is worth $6.00; No. 2 $8.00; and No. 3 $10.00. No. 1 worker is calculated for working from three to ten pounds at once.; No. 2 from eight to twenty pounds, and No. 3 from twelve to twenty-five pounds. Among the thousand and one machines which are worthless, this one is a great labor-saving machine.

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CHEESE.

REPORT OF COMMITTEE.

The exhibition of cheese was the largest and best we have ever seen, and does great credit to the exhibitors and the Society. The quality is most excellent, showing the high standard our dairymen have reached. The ten cheeses exhibited by Nelson Fry, of Gouverneur, St. Lawrence county, were the most even quality, for such a quantity, (the cheese weighing from 120 to 180 pounds each,) that has ever come under our notice. Mr. Fry's statement is recommended for publication.

QUESTIONS TO BE ANSWERED.

1st. Do you warm all the milk at all seasons of the year, or not —and why?

2d. At what degree of heat do you set, or add rennet—and why?

3d. Do you vary the heat at setting at different seasons of the year—and why?

4th. What kind of rennet do you use; how prepared; by what rule do you judge of the proper time to commence breaking the curd—and why?

5th. How do you break or make the curd fine—and why?

6th. Do you observe a rule as to the time occupied in breaking the curd—and what is it?

7th. Do you observe a rule as to the age of the curd when you begin to heat up to scald, and the time occupied in raising the heat—and why?

8th. How do you apply heat in scalding; what degree is used, and how long kept applied to the curd to cook it enough?

9th. Do you vary your rule in scalding at different seasons of the year—and why?

10th. How do you determine when curd is scalded enough?

11th. How do you separate the whey and curd; and what rule have you for tempering the curd for receiving the salt?

12th. What kind of salt used; how much, and how do you apply it, and at what particular state of the curd?

13th. How soon after applying the salt do you put the curd to press—warm or cold—and why?

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14th. What power do you press with; and how long?
15th. What is the cause of the pressing cloth adhering to the cheese, and what is your remedy?
16th. How do you give coloring to the cheese—inside or outside?
17th. How do you produce a rind impervious to flies?
18th. What kind of oil or dressing is used upon your cheese; and how is it applied?
19th. What is the cause of cheese swelling; and what is a remedy?
20th. Do you use the thermometer to test the degree of heat?

J. W. CANFIELD,—CHAMPION, JEFFERSON CO.

MANNER OF MAKING CHEESE.

First Premium for old Cheese.

Cheese made as follows: Milk set at 90° heat, curdled with rennet sufficient for cutting; in about fifty minutes after cutting let it settle; then take off the whey and work fine with a cutter; then heat gradually to a temperature of about 95°, and let it stand twenty or thirty minutes; then bring the heat up to 100°, and let it stand one hour; whey is then partly drawn off and a handful of salt added, stirring occasionally till sufficiently mixed; the remainder of the whey is then drawn off, and salt 3 lbs. to 100 lbs. of curd, with Turk's island salt; press with a screw press about one hour, and then take it out and put on a bandage, and put it in press and apply sufficient power to press it in one day.

The following are answers to questions required of those who presented cheese for premiums:

1st. I warm a part of the milk.

2d. I add the rennet at 90°. I think I can obtain more curd from setting milk at that temperature than any other.

3d. I always set the milk the same all seasons.

4th. I use calves' rennet prepared with the curd, it is salted, hung up and dried; the rule to judge of the proper time for breaking the curd is when it is sufficiently coagulated to not adhere to the cutter.

5th. The curd is made fine with the cutter.

6th. No rule observed as to the time occupied in breaking the curd.

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7th. No particular rule observed as to the age of the curd when to begin to heat up to scald; that must be left to one's own judgment.

8th. Heat is applied by heating whey till it is raised to 100°, and kept at 100° for one hour.

9th. Cheese should uniformly be made the same, unless skimmed, and then less scalding is required.

10th. I determine when curd is scalded enough by the degree of heat used, the length of time in scalding, and by the feeling of the curd.

11th. I separate the whey from the curd by having one end of the vat raised sufficiently to let the whey drain off. No particular rule for receiving the salt.

12th. I salt with Turk's island salt, 3 lbs. to 100 lbs. curd; salt is applied when nearly cold enough to go into press.

13th. The curd is put in the press in about fifteen minutes after the salt is applied, put in cold for two reasons: first, I think it makes milder cheese; second, you will not be as likely to have white whey.

14th. I press with a patent screw press one day.

15th. The cause of the pressing cloth adhering to the cheese is sourness, and the remedy is in keeping everything sweet.

16th. I give coloring inside by dissolving annatto in milk.

17th. No difficulty in procuring a good rind on cheese if sufficiently cooked.

18th. The oil is obtained from the whey cream, for the dressing of the cheese.

19th. The cause of cheese swelling is for the want of cooking.

20th. I always use a thermometer to test the degree of heat.

NELSON FRY.—Gouverneur, St. Lawrence Co., N. Y.

Who received the 1st Premium on cheese less than one year old, at the State Fair at Watertown, Oct. 1856, makes the following statement as to his method of making cheese:

1. I do *not* warm *all* the milk at any season, but I heat up about one-eighth part of the milk, as that mixed with the remaining seven-eighths, the whole will be warmed to 90°, Fahrenheit; 86° will do in very warm weather.

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2. In this state, i. e. the whole mass of milk being warmed to 90° I add the rennett.

3. Early in the spring, and after cold weather sets in, I wish the mass of milk to be warmed fully to 90° to do which requires the portion heated up to be made warmer than in hot weather.

4. I use calves' rennet. I full salt and dry the rennets for use. I soak in cold water in a stone jar three rennets with a little salt, sage, cloves and cinnamon; to three rennets put, say three quarts of water. To make a 100 pound cheese I use nearly a *pint* of this liquid.

5. I break the curd with a tin cheese cutter into fine squares, and then mix intimately by hand; then let it stand until the whey rises and the curd settles, stirring occasionally and dipping off the whey as fast as it rises.

6. No rule, only discretion.

7. As soon and fast as possible after dipping off the whey we heat it up and as soon as it is hot enough we dip it back into the curd for scalding; this we do gradually, stirring constantly, and when the whole mass is at 105° and thoroughly mixed, we let it stand forty or fifty minutes until the curd becomes *crumbly* and will be springy when squeezed in the hand, and will squeak when pulled between the teeth.

8. Answered above.

9. Don't vary the rule of scalding on account of the weather, except that in cold weather it will require more hot whey or hotter whey to bring the mass to 90°.

10. Answered under No. 7.

11. We spread a strainer on a large sink, (prepared for the purpose) and the whey drains off of itself without any squeezing, and while lying in the sink, on the strainer, I salt it, without minding the temperature—salting as soon as the whey is drained off.

12. To each 17 lbs. of cheese I use one teacupful of Onondaga salt, and apply as stated under No. 11—mixing very fine.

13. I let the curd get *cold* before putting to press; if put to press warm the cheese will stick to the strainer and will never have a smooth rind.

14. I use a patent cheese press, called the self presser; I don't know the amount of power; no danger of pressing too hard; I

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keep the cheese in press about seven hours; then take it out of the hoop, turn it upside down, bandage it and put it again in press for twelve or fourteen hours longer.

15. Answered under No. 14.

16. I put *no coloring matter* in the cheese, but I *put in all the cream*, which gives a rich, right color; outside we mix a very small quantity of annatto with *whey butter*, with this we rub the outside of the cheese, but I use only a very little coloring matter; I commence rubbing the outside of the cheese perhaps an hour after it is taken from the press; but not until the rind begins to *dry off*.

17. I have never been troubled with flies when I pursue the old method and rub every part of every cheese, every day with my hand.

18. Answered under No. 16.

19. I never had cheese swell much. I think it is caused by—1. Too little salt; 2d. Too much rennet; 3. If milk or curd was any part of it *sour* before put in press, it might produce puffing; 4. Want of cleanliness may induce a sour state in some parts of the elements of the cheese.

CHEESE DAIRIES.—Cortland Co.

Frederick and George Conable made from 30 cows 17,596 lbs. of cheese and 200 lbs. of butter during the season, averaging over 502 lbs. per cow.

Moses Kinney made from 50 cows and 7 heifers (equal to 55 cows,) 23,792 lbs. of cheese and 1,100 lbs. of butter, being an average of 432 lbs. of cheese and 20 lbs. of butter per cow.

MAPLE SUGAR.

The importance of this branch of farm industry in our State, should stimulate our farmers to its increase. The crop has sometimes reached ten million pounds per annum, and when the sugar is carefully prepared, is worth to the farmer from eight to twelve cents per pound. The syrup also sells at the highest price of the best foreign. Its manufacture is very simple, and when care is

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taken in tapping the trees so as not to injure them, an orchard will last for a great length of time, yielding a very large product. The high price of sugar at the present time, with a prospect of its continuance, will arouse our farmers to the importance of manufacturing as extensively as possible, and also to produce a first rate article.

The samples at the fair were excellent; and we give the statement of A. J. & A. Dike, Gouverneur, St. Lawrence Co., which is very brief, and which will secure a very fine quality of sugar.

METHOD OF MANUFACTURE.

First, all vessels used are kept sweet and clean. The sap is gathered and boiled as soon as possible after it comes from the trees, which prevents any unpleasant flavor which might be imparted to it by its being permitted to stand in the buckets. When it is boiled down to the consistency of thin syrup, it is strained through flannel and set aside to settle for at least twelve hours, when the pure portion is turned off and one-half pint of milk is added to syrup sufficient to make 50 lbs. of sugar, and put over a slow fire. When nearly boiling hot, the scum which rises is speedily removed with a skimmer, (as this if allowed to boil in again and mix with the sugar, will give it a darker color.) When boiled to the consistency of tub sugar, it is turned into a vessel shaped like an inverted cone, with an aperture in the bottom secured with a cork. When thoroughly cooled the cork is removed, and four thicknesses of flannel are moistened with cold water and spread on the top of the sugar, which are kept moist for about ten days, when the sugar will be sufficiently bleached.

CARROTS.

First Premium—1610 *bushels per acre.*

ADAMS, *December* 31, 1856.

I hereby certify that on the second day of June last, at the request of John Brodie, I surveyed for him the piece of land containing one acre, as herein described, to wit.: Beginning at a stake in or near the margin of a field, running thence south, 17½° west, 9 rods and 8 links to a stake; thence south, 77½° east, 8 rods and 11 links to a stake; thence south, 17½°

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west, 2 rods and 2 links to a stake; thence south, 77½° east, 7 rods and 5 links to a stake; thence north 17½° east, 11 rods and 10 links to a stake; thence north, 77½° west, 15 rods and 16 links to the place of beginning, containing as aforesaid one acre, lying in a southwesterly direction from the dwelling house on the farm owned and occupied by James Brodie, in Ellisburgh.

DAVID WALKER, *Surveyor.*

Sworn to this 2d day of Jan., 1857, before me,

NELSON GREEN, *Justice of the Peace.*

MAPLE GROVE, *Ellisburgh, Jefferson Co., Jan.*, 1857.

B. P. JOHNSON, Esq., *Sec. N. Y. State Agricultural Society:*

SIR:—On the 25th inst. I forwarded to your address a sample of a crop of carrots raised by me last season, and respectfully request you to enter my name on the list of competitors for a premium on the same. In compliance with the directions on your premium list, I submit the following statement, as the history of the crop:

The soil is a sandy loam, and when the farm was purchased by my father, in 1852, the ground from which these carrots were taken was a worthless swale of about 3 acres, through which cattle could not pass for miring, it being overflowed spring and fall. In the summer of 1852, it was drained with stone, at a cost of $97, or $32.33 per acre. In the spring of 1853 it was plowed and planted to corn, which yielded 80 bushels per acre. In the spring of 1854 we put on 20 horse cart loads of manure per acre, and sowed it to carrots. In the spring of 1855 we sowed it again to carrots, without any manure, and on one measured acre the yield was 1,700 bushels. In the spring of 1856, we had one acre surveyed, put on 30 horse cart loads of mixed horse and cow dung and 5 barrels of bone dust, spread and plowed in. We drilled in the seed with a Scotch machine that rolls and sows at the same time, using half a pound of large orange, and one and a half pounds of white, placing the rows 19 inches apart. On the 3d of July we passed through with a cultivator, and on the 12th of July gave it the first weeding; July 16th, put in the cultivator again, and on the 18th and 19th of August gave it the second weeding. The yield from the measured acre was 1,610 bushels of carrots, weighing 60 pounds to

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the bushel. (See certificate of David Walker, accompanying this statement.) The yield of white carrots was much greater than of the orange. No difference was perceived in the yield of those parts where bone dust was or was not applied.

COST OF CROP.

30 horse cart loads of stable manure at 25 cts.	$7 50
4 bushels bone dust at $1.75,	7 00
Hauling manure, 3 men and 2 horses one day,	4 50
Drilling with Scotch plow, two-thirds of a day,	1 38
Plowing and harrowing one half day,	1 00
Sowing seed 6s., sowing bone dust 4s.,	1 25
First cultivating, 1 hand and horse one-fourth day,	50
First weeding, 1 hand 6⅓ days,	6 33
Second cultivating, 1 hand and horse one-fourth day,	50
Second weeding, one hand two days,	2 00
Pulling and loading, 1 man 5½ days,	5 50
Man and horse, hauling to cellar 1½ days,	2 25
	$39 71
Cost of seed, 2 lbs. at 6s.	1 50
Total cost,	$41 21
Add rent of land at, per acre,	8 00
	$49 21
Value of 1610 bushels at 20 cts. per bushel,	322 00
Leaving as the nett profit of the crop,	$272 79

JOHN BRODIE.

Jefferson County, ss:

John Brodie, being duly sworn, says that he raised a crop of carrots the past season, upon the land surveyed by David Walker, and that the quantity of carrots was 1,610 bushels, measured in a sealed half bushel, and that he was assisted in harvesting and measuring said crop by William Bendlow and Hugh Brodie, and that the statement annexed, subscribed by this deponent, as to the manner of cultivation, expense, &c., is in all respects true, to the best of his knowledge and belief, and that the sample of carrots exhibited is a fair average sample of the whole crop.

JOHN BRODIE.

Sworn before me this 28th day of January, 1857,

DWIGHT COOLEY, *Justice of the Peace.*

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Jefferson County, ss:

Hugh Brodie and William Bendlow, being duly sworn, say that they assisted John Brodie in harvesting and measuring his crop of carrots, referred to in the above affidavit, and that the quantity of carrots was 1,610 bushels, as stated in the affidavit of John Brodie.

WILLIAM BENDLOW,
JOHN BRODIE.

Sworn to before me this 28th day of January, 1857,

DWIGHT COOLEY, *Justice of the Peace.*

TIMOTHY SEED.

First Premium—nine and one-sixth bush. per acre.

STATEMENT OF A CROP OF ONE ACRE OF TIMOTHY SEED RAISED BY E. S. HAYWARD, THE PAST SEASON.

The soil is black muck; subsoil clay; previous crop spring wheat; previous to wheat, oats; previous to the oats, ruta bagas for two years; land manured a little for the ruta bagas on part of it, and none on the other; no manure used after; timothy was sown at the time of sowing the wheat, (18th of May,) 8 quarts per acre. The wheat grew very rank during the fore part of the season, and then the insects took the whole lot, and the wheat was a total failure. The season was very wet, and smart weed and heart's ease grew most luxuriantly, and a better crop I never saw. I mowed the piece and cured it like hay, and stacked and fed it to horses and cattle in the winter, and used it for bedding. After the land was cleared, I twice made up my mind to plow it up again, and twice changed it; the timothy could only be seen in spots. I finally concluded to let it be, and harrowed it and sowed again with timothy, about 8 quarts per acre; and in the spring it looked bad, but it grew and spread so at haying time it was the best timothy I ever saw. I concluded to save one acre for seed, and did so. The crop was reaped and bound in bundles the 29th, 30th and 31st days of July, by women, and stood out four days from the last cutting, and hauled in the barn, thrashed with a flail, and after that with a thrashing machine; and straw put in the bottom of my straw stack for future use. I

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cleaned the seed with a common fanning mill, and sifted it with a grass seed seive. Yield 9¼ bushels per acre.

Expense of cultivating, harvesting and cleaning, ..		$8 00
Seed at $4.50 per bu.,	$41 63	
Stalks and tops sold,	14 29	
		55 92
Balance to crop		22 06 .

HON. HORACE GREELEY'S PREMIUMS TO BOYS UNDER 18 YEARS OF AGE.

The Committee examined three statements on corn, and one on carrots. The premium offered ($50) on corn, is recommended to Franklin B. Spaulding, East Otto, Cattaraugus Co., he having complied with the requirements, and having produced the best crop of corn. A small silver medal is recommended to Milton Ottley of Phelps, Ontario Co., one of the competitors, only 12 years of age. His statement of the crop shows great industry and intelligence for a lad of his age, and is deserving of encouragement. The crop of carrots is small, and the Committee do not deem it such as entitles the competitor to a premium.

The Committee highly approve of this manner of stimulating young men to the careful and particular cultivation of crops. They have no doubt, had the offer for those premiums been more extensively known, that a larger number of competitors would have competed for the premiums.

W. M. WHITE, of Allegany,
Chairman.

HON. HORACE GREELEY'S PREMIUM FOR ONE ACRE OF CORN.

Statement of one acre of corn raised by Franklin B. Spaulding, (under 18 years of age,) of East Otto, Cattaraugus Co.,—premium awarded of $50.

To the Hon. Benj. P. Johnson, *Corresp'd'g Secretary of the N. Y. State Ag. Society:*

The undersigned, son of Henry Spaulding, under the age of 18 years, respectfully submits the following statement of one acre of corn raised in the town of East Otto, county of Cat-

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taraugus, N. Y., in the year 1856, and asks to be considered a competitor for Hon. Horace Greeley's premium of $50.

1st. The crop on this acre of land in 1855 was corn, without any manure, planted on green-sward, plowed under in the fall of 1854; soil, gravelly loam.

2d. The land was plowed (with horses) the last of April, 1856, 10 inches deep; dragged twice; marked off for hills with a hand marker 3 feet apart each way; planted on the 17th day of May; corn appeared above ground on the 22d day of May; 4 kernels were planted to the hill, and 4 stalks were left to each hill; the corn was planted dry, without any previous preparation.

3d. The variety of corn planted was the Dutton (yellow) corn, 8 quarts of seed being used; 11¼ cords (128 cubic feet,) of green barn yard manure (droppings of cattle and horses) and including one-half cord of hog and hen manure, were used, spread broadcast and in the hill; the former plowed under and the latter put into the hill, covered over two inches deep with earth, upon which the corn was dropped and covered about two inches deep; it was cultivated lengthways and crossways twice, and hoed twice immediately after cultivating.

4th. The corn was cut up the middle (15th to 20th) of September, put up into "shocks," and left in the field about four weeks, when it was carted to the barn and husked, and the corn put into common, out-door slat cribs to dry; there were ten loads of stalks of half a ton each, valued at $4 per ton, or a total of $20.

5th. There were 152 bushels of ears of corn; 76 bushels of shelled corn, by a sealed one-half bushel measure; weighed 63 lbs. to the bushel, which, at 56 lbs. (vide Revised Statutes N. Y.) would make 85½ bushels per acre by weight,

6th. The amount of land was just one acre, as per survey of W. D. Armstrong, Surveyor, annexed to this statement.

7th. The following is a statement of the expenses, including the number of days work of the team and my own labor.

One acre of corn in account with Franklin B. Spaulding.

1856.		Dr.
April 25, 26.	3 days with team drawing manure, 2 horses and wagon,.....	$3 75
" 28.	3 days' labor of self, at 75c.,.....	2 25
" 30.	1 day plowing, 2 horses and plow,.....	1 25

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April 30.	1 day plowing, self,		75
May 14, 15.	2 days dragging, 2 horses and drag,		2 50
" "	" self,		1 50
" 16, 17.	1½ days marking and planting, self,		1 00
June 11.	1 day cultivating, 1 horse and cultivator, 75c., and self 75c.,		1 50
" 12, 13.	2 days hoeing, self,		1 50
July 8.	1 " cultivating, 1 horse 75c, self 75c,		1 50
" 9, 10.	2 " hoeing, self,		1 50
Sept. 12, 15, 16.	3 " cutting-up and shocking, self,		2 25
Oct. 13, 20.	6 " husking, self,		4 50
" 21.	1 " cribbing, self,		75
Dec. 21.	2 " shelling, self and machine,		2 00
			$28 50

	Cr.
By 76 bu. shelled corn, *8s.,	$76 00
5 tons stalks, at $4,	20 00
	$96 00
Less expenses,	28 50
Nett profits,	$67 50

(From this should be deducted the wheat upon the land and half the value of the manure.)

Respectfully submitted,

FRANKLIN B. SPAULDING.

East Otto, N. Y., January 29, 1857.

[Affidavits of Surveyor and persons who were cognizant of all the facts regarding the culture and measurement of the crop, accompanied the papers.—J.]

STATEMENT OF MILTON OTTLEY, OF PHELPS, ONTARIO COUNTY.

12 years old, a competitor for the Premium of Hon. Horace Greeley, for one acre of Corn.

Although the premium was not obtained by Master Ottley, the Executive Committee awarded him a silver medal, for his enter-

* Market value here this winter.

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prise in undertaking and carrying out the culture, as it proved, of a very hard piece of land.

It was not until the evening of the 30th of May last that I first saw your generous offer of a premium to boys under 18 years of age, for the cultivation of one acre of corn or carrots. I resolved at once to try one acre of corn, providing my father would consent to furnish me with land, team, tools, &c. On making application he agreed that I might make the trial, but thought me rather too young to persevere in the undertaking, my age being at the commencement of the job only 11 years and 10 months. However, I took the ox team, a yoke of 6 years old and a yoke of 3 years old, and one of Anson Titus' No. 9 pointer plows, and a boy to drive, and commenced my job on the morning of Saturday, the 31st of May. The condition of the soil at the commencement of the cultivation, was a three year clover lay, very hard and stony. It is what my father calls gravelly loam, but I thought it was very coarse gravel when I was plowing it, as I found a great many small cobble stone, which was very annoying to my undertaking. There was no manure applied previous to plowing of it. The manner of plowing, as I have said before, was with two yoke of cattle or steers, boy to drive, and with one of Anson Titus' No. 9 double or pointer plows, from six to seven inches deep. I then rolled it on the furrow before harrowing it, then harrowed three times in a place. I then took my father's drill, one of Tracy's grain drills, arranged for drilling corn, and drilled it on the 3d day of June. It appeared above ground on the 11th, making eight days from the time of drilling. The number of kernels in each hill or discharge was from four to six. The number of stalks designed to be left in each hill or discharge was from three to four, but as it was a prevailing complaint the past season of the failure of seed corn, not coming good, I was unable to regulate the number of stalks in each hill. The variety of corn is the white flint, a sample of which I will exhibit at the winter meeting of the New-York State Agricultural Society. The amount of seed drilled was 12 quarts. The quantity and quality of manure put upon the crop was 9 bushels of a compound of hen manure, ashes, plaster and salt, at the rate of one-third each of ashes, plaster, hen manure, and a half bushel of salt; applied a handful on each hill, as soon as up. My corn

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was hand-hoed but once, and that a mere dressing out of the large weeds; but I gave it three cultivatings twice in each row with our horse hoe. I cut up my corn in the last week of September, husked during October. I had two loads of stalks or 330 bundles worth two cents each, which amounts to $6.60. My corn was shelled on the 3d day of January last, and measured in a sealed half bushel. There was 51$\frac{2}{3}$ bushels, and as I have mentioned before of the failure of seed corn the past year, I was induced to plant in white beans, as I did, and raised 3$\frac{1}{2}$ bushels of good beans. I will also exhibit a sample of them at the winter meeting. My father thinks if the seed corn had come good I would have had 15 bushels more of corn, and 75 or more bundles of stalks. I have endeavored to carry out your rules. The work has all been done by myself except the boy to drive while plowing, and assistance in drawing the stalks and shelling and measuring the corn. My account is as follows, together with the affidavit of the surveyor, myself, and person knowing to the above, &c.

The following is a statement of the expenses and value of the same:

			Dr.
June 2, 1856,	to	2 days by self, at 4s.,	$1 00
"	"	" " boy to drive, at 4s.,	1 00
"	"	" " team to plow,	2 00
June 3,	"	1 hour rolling with team,	25
"	"	2 " harrowing,	38
"	"	1 " drilling,	25
"	"	12 quarts seed corn,	25
June 14,	"	9 bush. comp'd hen manure, &c., at 10c.,	90
"	"	1 day applying manure,	50
June 17,	"	half day cultivating first time, self and horse, twice in a row,	50
"	"	$\frac{1}{4}$ day cultivating 2d time, once in row,	25
"	"	$\frac{1}{4}$ " " 3d " " "	25
July	"	1 day hoeing or dressing,	50
Sept	"	2$\frac{1}{2}$ days cutting up, at 4s.,	1 25
Oct.	"	husking 110 bush. ears, at 4 cts.,	4 40
"	"	cribbing corn and drawing stalks,	1 00
Jan. 3, 1857,	to	shelling and cleaning, at 2 cts.,	1 60

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Jan. 5, 1857, to 1 load to market, 3 miles,	1 00
Interest on land at $100 per acre,	7 00
	$23 68

Cr.

January 5, 1857, by 51⅓ bushels, at 5s.,	$32 06
" " " 330 bundles stalks, at 2 cts.	6 60
	$38 66

JOHN P. MATTOON, OF VIENNA, ONEIDA CO.

16 *years of age, also a competitor for the Premium.*

He raised 70 bushels and 3 quarts to an acre, at an expense of $28.50.

Corn sold for 6s. per bushel,	$52 57
Three loads of stalks, 20s.,	7 50
	$60 07

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THE AMERICAN ELK DOMESTICATED.

[From Cattaraugus Co. Report.]

Mr. George Stratton, of Little Valley, has been experimenting for a few years past with a view to test the practicability of domesticating elk; and for this purpose enclosed a tract of very hilly land, well wooded for ranging and browsing. His animals are so well trained that he has driven several of them to the three last fairs of Cattaraugus Co. without any difficulty, where they attracted great attention. In answer to a note of inquiry, Mr. Stratton has furnished the following interesting paper, and it is hoped that the suggestions it contains may attract attention. The success attending Mr. Stratton's experiments thus far certainly argues well for more extended efforts.

Dear Sir :—I came in possession of my first pair of elk in the spring of 1853, in the course of trade with the agents of a Western Fur Company, who had purchased the fawns of a tribe of Indians on some of the head branches of the Missouri river. At the time of my purchase I had no other object in view than the hope of reproducing a few and having the pleasure of seeing a herd of these magnificent foresters quietly feeding on the identical grounds where nature had once planted and provided for their ancestors in untold numbers. In view of their rapid decrease on the approach of civilization, and the threatening prospect of exterminating the entire race, I have deemed it something more than idle curiosity to preserve from destruction some of the characteristics of our American forests. It is not yet fifty years since the elk were so numerous in this county that the Indian or pioneer trapper, after furnishing his store of provisions for his breakfast, might with confidence expect to sup on a choice cut from the surloin of an elk; and the Indian is now living who can boast of killing three elk in one day within an hundred rods of where

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you have held your three last agricultural fairs; and another Indian informs me that he once killed an antlered buck within rifle shot of the Cattaraugus depot, and as near as can now be ascertained, the famous forester fell on the precise ground where since has been reared the elegant and substantial residence of Judge Leavenworth. But what a change has been wrought since! It has now been some years since the last track of the elk has been seen in the fastnesses of the Pennsylvania woods. It is said there may yet a few be found on the western shore of lake Horicon, in the vicinity of the Ausable river. Where next may we find them? Within six or seven years herds of hundreds, and perhaps thousands, were to be found in the vicinity of St. Paul, Minnesota; but now we might as well look for them in Orange county. Their western range being large prairies, skirted with narrow strips and small patches of woodland, they were easily slaughtered and driven off by the first settlers, and at the present time they are only to be found by at least a week's journey beyond the lines of civilization. The first thing that called my attention to this matter as likely to afford any pecuniary profit, was a document laid before the Senate by Hon. Wm. R. King, Vice-President of the United States, and also president of the Senate, by Professor S. F. Baird of the Smithsonian Institution, at the instance of Thomas Ewbanks, Commissioner of Patents—the substance of which document was a call on the government for means to procure, domesticate and restock certain portions of land in New-York, Pensylvania and other States, which were nearly or quite worthless for agricultural purposes, but would still be a most inviting place for this purpose; citing as sufficient proof of its practicability, that formerly this country produced elk as naturally as it does now *Brush* and *White Rabbits*.

Now, as I had a pair of elk, and a quantity of this description of land, at the time my attention was called to this view of the subject, it readily occurred to me that I might indulge my fancy in this business, with a fair prospect of a handsome remuneration. I therefore set about it in a business way, by purchasing at different times, three more elk, and preparing them a pasture of one hundred and twenty-five acres of well-fenced woodland, in which they have now been for three years, without any additional expense, worth naming, beyond a visit to the park some three or

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four times a week, at which times I always carry a pocket of corn, oats, or in the summer time, a handfull of clover-heads, of all which they are very fond; and, in this way, I keep on excellent terms with them. My success in domesticating them, by this sort of treatment, has been quite satisfactory; instead of scampering away, like wild animals, when I approach them, they crowd around me like so many pets. My original number of five purchased elk, have increased to ten, with a prospect of an additional increase of four next spring. During the winter, and in time of deep snows, they gather into a thicket of brush, (which embraces about one-half these grounds,) which they trim with great apparent relish; and notwithstanding the deep snows, and severe winter of 1855–6, they remained in high order, with no other resources than the staddle timber or brush, which they trimmed and laid waste by the acre. The enclosure I have for them, would be quite sufficient to sustain from fifty to sixty elk, until they have destroyed the brush, at which time their pasture would have to be extended over new territory, or trees be cut in winter for them to browse. Now, in view of the character and price of large quantities of land in this country, also of the fact that these mountain ranges were formerly the natural home of the elk, and their perfect susceptibility of domestication, I deem it an enterprise of the first importance that portions of these lands should be re-stocked with their original denizens. And not only to the naturalist, the man of science, but to those wishing a profitable investment, it holds out every inducement. When we consider the amount of lands in this country only fitted for such purposes, I do not hesitate to say that it might be made a business of vast importance. While the world is being ransacked to obtain rare and foreign animals, which may never be acclimated to this country, and whose utility is rather questionable if they should be, the elk with all its claims to our attention, with scarcely an effort to domesticate, is rapidly disappearing from the land. When we consider the short space of time (say 50 years,) since the elk ranged the entire country between this and the Mississippi river, it is a fair estimate, with the increased facilities of travel and emigration, and what is being done in the territories of Utah, Nebraska, and Dacotah, that within twenty-five years the race will be entirely extinct, unless proper means is resorted

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to for their domestication,—not a very pleasant prospect when our forests might produce, at comparatively small expense, an abundance of venison, the quality of which is the very crowning dish of the epicure,—adding materially to the wealth and the importance of the country.

The elk, although having many characteristics of the deer, in his manner of living, has yet a strong individuality of his own; is not particular, timid, or liable to stampede or sudden fright, like the deer, but depends more upon prowess, than flight, in case of danger. The elk is not so restless in disposition, and therefore more disposed to fatten. I have been much surprised to see my whole number (ten) in higher condition than any ten animals that could be selected among all the domestic cattle on the farm which had the advantage of good pasture.

The weight of a full-grown buck is, from five to six hundred pounds; that of a doe, from four to five hundred. They mature at about four years of age. The bucks only have antlers, which they shed yearly like the deer.

LORENZO STRATTON.

Little Valley, N. Y., Feb., 1857.

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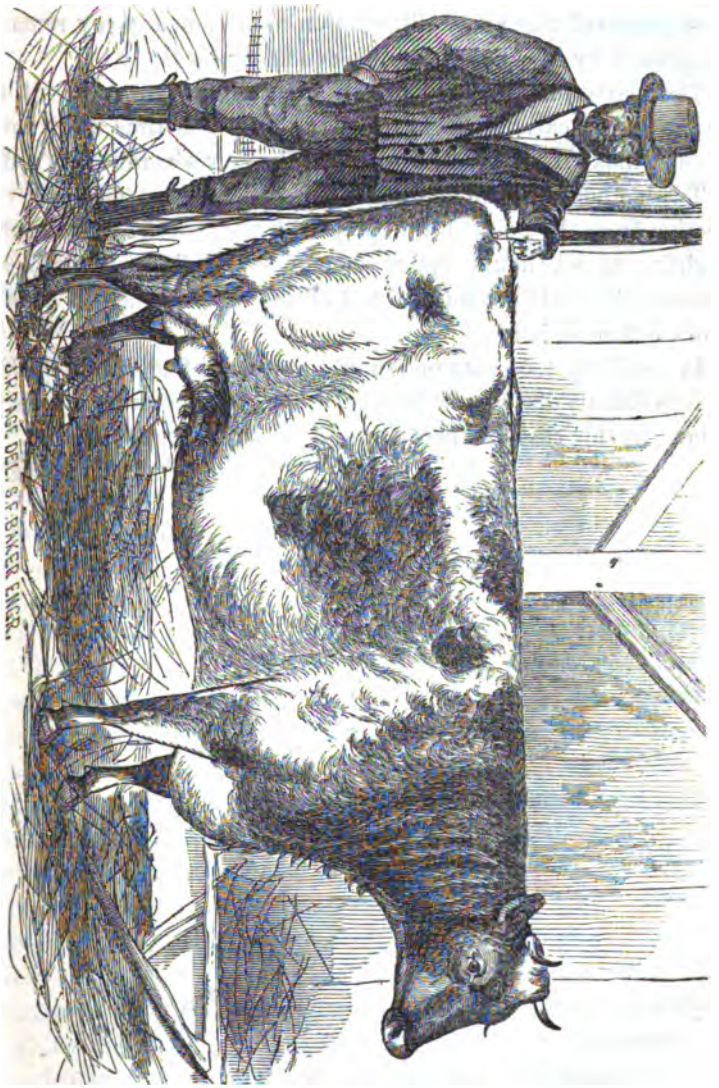
THE CALVING COW.

We give annexed an illustration as to the manner of determining the time of calving of the cow. Although many may be



familiar with this, we presume it will be interesting and useful as a matter of reference to many farmers whose attention may not

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have been called to it. We are furnished by J. R. Page of Sennett, with the description accompanying the cut.

For many years I have been able to determine with certainty whether my cow would calve *within* six or twelve hours by *touching*; and, presuming that many may not be aware of the facts, have prepared the above illustration to accompany my remarks. (Engraved by Mr. Baker for this article gratis.)

The parts just forward of the point of the rump about two weeks before calving begin to relax; from this time until parturition I make it my practice to touch the cow several times a day.

Twelve hours before calving, the cartilages that form the connection from the point of the rump with the roots of the tail soften slightly; at six hours before labor, if everything is right and natural, the parts are soft, no feel of the cartilage, which at other times is firm as bone.

In touching, (see cut) one should apply the finger to both sides, as occasionally one side softens entirely while the other side is yet firm. In this case I expect an increase within twelve hours.

J. R. PAGE.

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AGRICULTURAL STATISTICS.

In connection with the census of agricultural productions, as at ante p. 201, we give the Agricultural Statistics from the introduction to the Census Report, which were not received in time to be given at the proper place. These statistics furnish matters of special interest to the farmers of the State, and will be found peculiarly appropriate in the Transactions of the Society, for reference hereafter.

The earliest attempt to collect the agricultural statistics of New-York, was made in 1821. The number of acres of improved land, and the number of neat cattle, horses and sheep were then returned, together with a few branches of manufactures that will be hereafter noticed. In 1825 and 1835 the same inquiries, with the addition of swine to the list of domestic animals, were required.

In 1840, the number of horses, mules, cattle, sheep, and swine, and the value of poultry were ascertained. The number of bushels of wheat, barley, oats, rye, buckwheat and corn, the pounds of wool, hops, and wax, the bushels of potatoes, the tons of hay and of hemp and flax, the pounds of sugar made, and cords of wood sold, the value of the products of the dairy, orchard, and market garden, the gallons of wine made, and the number of men employed, and capital invested in nurseries, were also ascertained.

In 1845, to the above inquiries in reference to live stock and amount of the product of the cereal grains and root crops, was added the amount of land devoted to each separate crop. The censuses of 1850 and 1855 adopted similar inquiries, in addition to which the latter provided for the return of unenumerated articles of farm produce, and the amount, kind, and value of special manures employed. The following comparative summaries exhibit the results of these several enumerations.

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SUMMARY OF AGRICULTURAL RETURNS IN NEW-YORK, AS SHOWN BY SUCCESSIVE CENSUSES.

	Electoral State Census. 1821.	State Census. 1825.	State Census. 1835.	National Census 1840.	State Census. 1845.	National Census 1850.	State Census. 1855.
Acres of land,*	.....	.....	.....	.....	.....	19, 119, 084	26, 758, 183½
do improved,	5, 717, 494	7, 160, 967	9, 655, 426	.....	11, 757, 276	12, 408, 964	13, 657, 490½
do unimproved,	.....	.....	.....	.....	.....	6, 710, 120	13, 100, 692½
Farms, total number,	.....	.....	.....	.....	.....	170, 621	231, 740
Cash value of farms,	.....	.....	.....	.....	.....	$554,546, 842	$799,355, 367
do stock,	.....	.....	.....	.....	.....	$73, 570, 496	$103,776, 053
do tools and implem'ts	.....	.....	.....	.....	.....	$22, 084, 926	$26,927, 502
Acres plowed the year previous,	.....	.....	.....	.....	.....	.....	3, 377, 471
Acres in fallow the year previous,	.....	.....	.....	.....	.....	.....	506, 030½
Acres in pasture the year previous,	.....	.....	.....	.....	.....	.....	4, 984, 114½
Meadow, acres,	.....	.....	.....	.....	.....	.....	3, 384, 440½
Tons of hay,	.....	.....	.....	3, 127, 047	.....	3, 728, 797	3, 256, 948½
Bushels of grass seed,	.....	.....	.....	.....	.....	96, 493	120, 866½
Spring wheat, acres sown,	.....	.....	.....	.....	.....	.....	194, 346½
Bushels harvested,	.....	.....	.....	.....	.....	.....	2, 033, 353
Winter wheat, acres sown,	.....	.....	.....	.....	.....	.....	601, 141½
Bushels harvested,	.....	.....	.....	.....	.....	.....	7, 059, 049½
Wheat of both kinds, acres sown,	.....	.....	.....	.....	1, 013, 665	.....	795, 487½
Bushels harvested,	.....	.....	.....	12, 286, 418	13, 391, 770	13, 121, 498	9, 092, 402½
Oats, acres sown,	.....	.....	.....	.....	1, 026, 915	.....	1, 349, 384½
Bushels harvested,	.....	.....	.....	20, 675, 847	26, 323, 051	26, 552, 814	27, 015, 296
Rye, acres sown,	.....	.....	.....	.....	317, 099	.....	281, 714½
Bushels harvested,	.....	.....	.....	2, 979, 323	2, 966, 322	4, 148, 182	3, 039, 438
Barley, acres sown,	.....	.....	.....	.....	192, 503	.....	212, 608½
Bushels harvested,	.....	.....	.....	2, 520, 068	3, 108, 704	3, 585, 059	3, 563, 540
Buckwheat, acres sown,	.....	.....	.....	.....	255, 495	.....	293, 233½
Bushels harvested,	.....	.....	.....	2, 287, 885	3, 634, 679	3, 183, 955	2, 481, 079½

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Indian corn, acres planted,					595, 134		917, 601
Bushels harvested,				10 972, 286	14, 722, 114	17, 858, 400	19, 290, 691½
Potatoes, acres planted,					255, 762		220, 575½
Bushels harvested,				30, 123, 614	23, 653, 418	15, 398, 368	15, 191, 852½
Peas, acres sown,					117, 379		48, 154½
Bushels harvested,					1, 761, 503	†	705, 967½
Beans, acres planted,					16, 231		16, 917½
Bushels harvested,					162, 187	†	244, 079
Turnips, acres sown,					15, 322		7, 584½
Bushels harvested,					1, 350, 332		985, 522½
Flax, acres sown,				‡	46, 089		11, 764
Pounds of lint,					2, 896, 000	§940, 500	4, 907, 556½
Bushels of seed,						57, 963	87, 093½
Hemp, acres sown,				‡			3½
Tons of hemp,						§4	½
Hops, acres planted,				447, 250			9, 481½
Pounds harvested,						2, 536, 299	7, 192, 254
Tobacco, acres planted,				744			786½
Pounds harvested,						83, 189	946, 502½
Apple orchards, bushels of apples,							13, 668, 830½
Barrels of cider,				$1,701, 935		1, 761, 950	273, 639
Orchards, value of products,							
Market gardens, acres cultivated,				499, 126		912, 047	12, 590½
Value of products,				10, 048, 109		10, 357, 484	1, 138, 682
Maple sugar, pounds made,						56, 539	4, 935, 815½
Molasses, gallons made,				6, 799			85, 091½
Wine, gallons made,						9, 172	18, 181½
Honey, pounds collected,				52, 795		} 1, 755, 830	{ 2, 557, 876
Wax, pounds collected,				1, 735½		}	{ 138, 033½
Silk, pounds of cocoons raised,					¶	1, 774	267½
Neat cattle, total number,	1, 215, 049	1, 513, 421	1, 885, 771	1, 911, 244	2, 072, 330	1, 877, 639	2, 105, 465
Under one year old,					334, 456	} 767, 406	{ 311, 474
Over one year old,					1, 709, 479	}	{ ††577, 887
Working oxen,						178, 909	144, 597
Cows,					‖999, 490	‖931, 324	1, 068, 427

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SUMMARY OF AGRICULTURAL RETURNS.—(CONTINUED.)

	Electoral State Census. 1821.	State Census. 1825.	State Census. 1835.	National Census 1840.	State Census. 1845.	National Census 1850.	State Census. 1855.
Cattle killed for beef,	.....	.....	.....	.....	.....	**	225, 338
Butter, number of pounds,	.....	.....	.....	.....	79, 501, 733	79, 766, 094	90, 293, 073½
Cheese, number of pounds,	.....	.....	.....	.....	36, 744, 976	49, 741, 413	38, 944, 249½
Milk, gallons sold to market,	.....	.....	.....	.....	.....	.....	20, 957, 861
Dairy products, total value,	.....	.....	.....	10, 496, 021	.....	.....	.....
Horses,	262, 623	349, 628	524, 895	} 474, 543	} 505, 155	447, 014	579, 715
Mules,	.....	.....	.....	}	}	963	2, 254
Swine, total number,	.....	1, 467, 573	1, 554, 358	1, 900, 065	1, 584, 344	1, 018, 252	1, 069, 792
Under six months,	.....	.....	.....	.....	.....	.....	530, 176
Over six months,	.....	.....	.....	.....	.....	.....	539, 616
Sheep,	2, 147, 351	3, 496, 539	4, 261, 765	5, 118, 777	‡‡6, 443, 855	3, 453, 241	3, 217, 024
Wool, pounds shorn,	.....	.....	.....	9, 845, 295	13, 864, 828	10, 171, 301	9, 231, 959½
Number of fleeces,	.....	.....	.....	.....	4, 607, 012	.....	2, 630, 203
Poultry, value of,	.....	.....	.....	$1, 153, 413	.....	$1, 280, 333	.....
Value sold year previous,	.....	.....	.....	.....	.....	.....	$1, 071, 598
Eggs, value, sold the year previous	.....	.....	.....	.....	.....	.....	$1, 360, 673
Nurseries, number of men empl'yd	.....	.....	.....	525	.....	.....	.....
Value of products,	.....	.....	.....	$258, 558	.....	.....	.....
Miscellaneous products, total value	.....	.....	.....	.....	.....	.....	$1, 421, 750
Cords of wood sold year previous,	.....	.....	.....	1, 058, 923	.....	1, 058, 923	.....

* The area of the State, according to Burr's Atlas, is 28,297,142 acres. In 1855, 28,059,994 acres were assessed. The aggregate assessed value of real estate in 1855, was $1,107,272,715

† The amount of peas and beans in 1850 was reported at 741,546 bushels.

‡ Tons of flax and hemp, 1840, 1,030½,

§ In addition to this there were reported 1,180½ tons of flax and hemp.

¶ Pounds of raw silk manufactured from cocoons, 1,439.

‖ Number of cows milked.

** Value of animals slaughtered 1850, $13,573,884.

†† Number of neat cattle over one year old, exclusive of working oxen and cows.

‡‡ Of this number 1,870,728 were under one year old; 4,505,369 over one year old, and 67,758 age not stated.

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In obtaining the present census, the agricultural inquiries were directed to be made of the person in charge of each farm, or if removed, of those having the best means of information.*

* The instructions that were given for obtaining information under the several heads of agricultural statistics were in substance as follows:

Acres improved, to include all land reclaimed from a state of nature, deducting highways, lakes, and ponds of water, when latter exceeded ten acres in area.

Acres unimproved, to include all woodlands, uncultivated swamps and marshes, and lakes, and ponds of water over ten acres in area, if considered private property. Unimproved village and city lots, unless cultivated, were not to be returned.

Cash value of farms, to include the value of the whole farm, including buildings and improvements, as well as wild or unimproved lands. In making this estimate, reference was to be had to the price the farm would ordinarily bring, if sold, and without reference to its assessed value.

Cash value of stock, to be ascertained with reference to the current price of property of this kind in the vicinity on the first day of June, 1855. It would, of course, depend upon nearness to market, and other circumstances.

Cash value of tools and implements.—All machinery used for agricultural purposes only, as cider mills and presses, steam or other power, and machinery for thrashing, sawing, churning, &c., fixtures for making maple sugar, vehicles, and the tools, machines, and implements of farm labor generally, were directed to be included under this head. Pleasure carriages were not included.

Acres plowed the previous year.—In this column were entered the number of acres plowed in the spring of 1854, for spring sowing and planting, but not the number plowed for the sowing of winter grain in the fall, after producing a spring crop.

Acres in fallow the previous year.—This column was to include no part of the land entered in the last preceding column.

Acres in pasture the year previous.—This included only inclosed pastures. Highways, fallow, and land entered as unimproved were not embraced.

Acres in meadow, to include the amount of land reserved for mowing grass or clover. As the season to which the census referred was one of unusual drouth, in some sections, cases might occur in which land so kept was not mowed; still, if so reserved, it was to be entered as meadow. Some misunderstanding occurred with a few marshals at an early stage of the census, by applying to the term "meadow," the English definition, of a *flat intervale* not necessarily mown, but perhaps planted or sown. The term as used in this country is, it is believed, applied as directed in the instructions, to all land mown for hay.

Tons of hay.—As farmers seldom weigh the hay they collect for their own use, this inquiry in most cases was expected to be merely an approximation, estimated with reference to bulk, extent of meadow, and amount of stock supported through the winter.

Bushels of grass seed.—This included the aggregate amount of grass seed specially harvested, or screened, from grain the year preceding. The seed of timothy, or herds grass, (*Phleum pratense*), is believed to have been almost exclusively referred to under this head. Clover, lucerne, and other seeds of plants not gramineæ, raised for feeding stock, were not entered in this column, but in the columns for unenumerated articles of farm produce.

Acres of spring wheat sown, and bushels harvested.—These referred to the season of 1854, in which this crop was unusually short.

Acres of winter wheat sown, and bushels harvested.—These referred to the crop sown in 1853, and harvested in the summer of 1854. The acres sown, were directed to be entered whether harvested or not. In some instances the crop was so injured by drouth and insects as not to be worth the labor of gathering.

Acres and bushels of oats, rye, (both winter and spring), barley, buckwheat, corn, potatoes, peas, beans, turnips and flax.—These all referred to the crop of 1854, and were mostly considerably below the average of common years.

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It will be remembered that the return of crops, as given in the present census, are those of 1854, which year was characterized by an unusual drought.* With the expectation that these results would fall short of the average of common years, and present an incorrect view of the agricultural capabilities of our soil, unless associated with data, showing the cause and extent of the deficiency, a blank was furnished to each marshal for entering the relative yield of the several field crops, as compared with favora-

*The following table shows the total depth of rain in inches and hundredths, reported as falling at several stations within the State, during part of the year, by which it appears that the amount was unusually great in April, and considerably less than the common average in July and August. The greater amounts for June at Clinton, Mexico, and Rochester, and for July at Oxford, appear to have been from local showers. The general mean for the whole

Pounds of lint.—Large crops, for the manufacture of cordage, were occasionally reported in tons. Care was taken in summing these returns to reduce them uniformly to pounds.

Acres and quantity of hemp, hops and tobacco, bushels of apples, and barrels of cider.—These also referred to the yield of 1854.

Acres of market gardens cultivated, and value of product.—No account was taken in this census of the products of small gardens for domestic use, but only those devoted to the raising of culinary vegetables for market. The aggregate value raised in 1854, without specification of items, was required.

Pounds of maple sugar, and gallons of molasses.—These quantities referred to the spring of 1855.

Gallons of wine made.—This related to wine made from grapes in 1854. Currant and other wines were reported under the head of unenumerated articles of farm produce.

Pounds of honey and wax collected in 1854, both from wild and domestic bees. The relative quantities of these products could not, in many instances, be ascertained, on account of the honey being sold in the comb.

Silk, pounds of cocoons.—The quantity referred to 1854, and was much less than that indicated by previous censuses.

Unenumerated articles of farm produce.—Columns were provided for entering under this head the kind, quantity and value of every crop made a special subject of cultivation, and for which no other place was assigned.

Domestic animals, as specified in the agricultural returns of this census, referred to June 1, 1855. An attempt was made to obtain the number of cows milked, the number milked for butter, for cheese, and for the milk market, but it was found impracticable to derive useful results from this arrangement, on account of the uncertainty often arising as to which class they were to be assigned. In the same dairy, butter and cheese are often made from the milk of the same cows. The percentage of cows not milked is probably small. There is reason to believe that the number of horses and cows kept by villagers, who own no land, is reported too small. The number of sheep is reported, in many cases, different from the number of fleeces and quantity of wool shorn. This apparent inconsistency arises from the former referring to 1855, and the latter to 1854.

Value of poultry and eggs sold.—These inquiries referred to the year preceding June 1, 1855.

Special manures.—The kind, quantity and value of special manures, purchased and used on farms, was directed to be entered in the agricultural schedule. The term "special manure," was defined to include guano, gypsum, poudrette, saline compounds, and other substances prepared and sold as fertilizing agents, aside from those ordinarily produced upon farms. Of the latter no return was made. In many instances, two or more of these were so reported together that they could not be separated, and sometimes the value only was given. These were classed under the general term "miscellaneous," without further specification.

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ble seasons, and the cause of failure, if existing. This was to be determined from his own observation, and by inquiry of those best informed upon the subject. The results given are those actually observed, without reference to relative quantity. The aggregate opinions thus obtained are scarcely capable of reduction into definite form from the very unequal field of observation of the different marshals, and the failure of many to make reports on this subject where there was a manifest occasion. Of the 1,744 marshals appointed to collect the materials of this census, about 1,450 made returns of agricultural statistics, the remainder being in cities and large villages. The principal cause of failure was drought, and its extent was estimated as follows:

State during twenty-five years, taken from the official reports of academies to the Regents of the University, is added for convenience of comparison :

PLACES OF OBSERVATION AND YEARS	DEPTH OF RAIN.					
	April.	May.	June	July	Aug.	Sept.
Albany, Albany county, 1854,	6.82	1.79	2.96	3.35	0.62	3.87
Clinton, Oneida county, 1854,	8.19	2.70	4.81	2.76	2.60	3.92
Elmira, Chemung county, 1854,	6.09	2.86	5.09	3.12	1.16	3.25
Flatbush, Kings county, 1854,	11.36	5.34	2.17	1.69	0.85	3.22
Geneva, Ontario county, 1854,	5.20	2.21	2.48	0.89	0.77	3.27
Homer, Cortland county, 1854,	5.84	2.33	3.31	2.19	2.19	3.71
Jamaica Queens county, 1854,	11.19	6.25	1.33	2.51	1.26	3.22
Liberty, Sullivan county, 1854,	6.70	5.55	2.37	2.42	0.92	3.21
Mexico, Oswego county, 1854,	4.51	3.06	4.56	2.92	1.72	4.84
New-York city, 1854,	10.11	4.28	2.29	2.81	1.06	4.15
Oxford, Chenango county, 1854,	7.11	3.22	2.10	4.04	2.08	4.77
Plattsburgh, Clinton county, 1854,	2.29	1.45	2.95	0.99	0.39	3.81
Rochester, Monroe county, 1854,	2.43	2.15	5.47	0.25	1.82	5.18
White Plains, Westchester county, 1854,	8.20	5.19	1.80	3.02	0.40	5.40
Mean of the above, 1854,	6.85	3.45	3.11	2 35	1.27	3.99
Mean quantity in 1826,	1.99	0.81	7.02	3.12	2.21	2.88
do 1827,	3.72	2.81	3.48	3.70	4.08	4.00
do 1828,	2.41	3.28	3.74	5.69	3.20	5.29
do 1829,	3.62	2.48	3.30	3.16	3.12	3.01
do 1840,	1.95	3.74	6.15	4.15	1.55	2.63
do 1831,	4.10	2.71	3.91	4.42	3.81	3.54
do 1832,	2.39	3.15	1.72	4.00	5.37	2.75
do 1833,	1.31	5.56	3.24	4.41	3.29	2.98
do 1834,	2.72	3.26	4.29	3.38	1.74	2.97
do 1835,	4.03	1.90	4.76	3.61	3.90	1.81
do 1836,	2.24	3.42	4.59	2.58	1.87	2.50
do 1837,	1.85	4.21	4.39	3.69	5.12	2.05
do 1838,	1.49	4.34	4.28	2.44	3.51	3.41
do 1839,	2.42	3.79	4.11	3.92	2.43	2.64
do 1840,	3.40	3.15	3.20	3.13	3.49	3.12
do 1841,	3.55	1.98	2.79	2.65	2.65	3.26
do 1842,	2.90	2.33	3.68	4.18	3.43	5.31
do 1843,	2.84	1.90	4.37	2.99	4.35	3.66
do 1844,	1.37	4.85	2.85	4,63	2.99	1.84
do 1845,	2.29	2.52	2.89	2.74	1 92	3.64
do 1846,	1.14	3.92	2.63	4.25	2.78	2.10
do 1847,	1.79	2 09	3.83	3.15	2.99	5.13
do 1848,	1.02	4.95	3.37	4.91	2.45	2.57
do 1849,	1.34	4.11	2.39	1.13	3.75	1.87
do 1850,	2.15	2.51	2.98	5 80	3.63	4.69
Mean quantity of 25 years, 1825–50,	2.53	2.31	3.75	3.59	2.99	3.11

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	Total number of marshals reporting relative yield.	AMOUNT REPORTED.					
		Usual yield.	Three-fourths the usual yield.	Two thirds the usual yield.	One-half the usual yield.	One-third the usual yield.	One-fourth or less of the usual yield.
Spring wheat,	800	86	142	112	288	69	103
Winter wheat,	519	50	74	59	129	55	159
Rye,	800	147	180	154	204	58	57
Oats,	1,279	45	201	216	479	160	178
Barley,	872	74	193	155	283	68	99
Peas,	688	61	85	76	239	80	147
Beans,	622	57	67	57	214	54	173
Corn,	1,181	99	218	211	401	117	135
Buckwheat,	1,159	25	60	42	276	108	648
Potatoes,	1,176	74	153	114	446	148	311
Turnips,	529	88	67	33	169	21	151
Flax,	146	39	20	14	43	5	25
Hemp,	19	5	1	5	6	.....	2
Hops,	149	61	45	15	15	2	11
Tobacco,	40	12	8	6	8	3	3
Apples,	905	230	93	69	212	55	247
Market gardens,	153	18	24	25	45	17	24
Meadows,	1,190	80	216	248	451	111	84
Butter dairies,	1,091	119	564	285	88	10	25
Cheese dairies,	513	54	260	122	50	8	19

In addition to the above, there were reported failures from other causes, as insects, worms, blight, winter and spring kill, rust, hail, frost, storms, and running fires, either singly or combined with each other, and with drought. These causes operate more or less every year in some part of the State, and their influence upon the crops of 1854 cannot therefore be considered as affecting the average yield, except so far as they were aggravated by the drought. The relative influence of these causes were as follows:

Spring wheat, three-fourths of the usual yield, 16; two-thirds, 18; one-half, 56; one-third, 23; one-fourth and less, 38.

Winter wheat, three-fourths, 39; two-thirds, 39; one-half, 105; one-third, 93; one-fourth and less, 252.

Rye, three-fourths, 35; two-thirds, 15; one-half, 35; one-third, 5; one-fourth and less, 5.

Oats, three-fourths, 9; two-thirds, 13; one-half, 27; one-third, 14; one-fourth and less, 10.

Barley, three-fourths, 9; two-thirds, 6; one-half, 12; one-third, 2; one-fourth and less, 7.

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Peas, three-fourths, 2; two-thirds, 5; one-half, 15; one-third, 2; one-fourth and less, 7.

Beans, three-fourths, 4; two-thirds, 1; one-half, 5; one-fourth and less, 2.

Corn, three-fourths, 27; two-thirds, 24; one-half, 39; one-third, 13; one fourth and less, 16.

Buckwheat, three-fourths, 1; two-thirds, 5; one-half, 21; one-third, 7; one-fourth and less, 38.

Potatoes, three-fourths, 3; two-thirds, 2; one-half, 25; one-third 6; one-fourth and less, 18.

Turnips, two-thirds 1; one-half, 5; one-third, 1; one-fourth and less, 4.

Hops, three-fourths, 1; two-thirds, 2; one-half, 1; one-fourth, 2.

Tobacco, three-fourths, 1.

Apples, three-fourths, 9; two-thirds, 15; one-half, 57; one-third, 15; one-fourth or less, 62.

Market gardens, three-fourths, 1; one-half, 1; one-third, 1; one-fourth, 1.

Meadows, three-fourths, 5; two-thirds, 11; one-half, 24; one-third, 2; one-fourth and less, 4.

Cheese dairies, three-fourths 1; one-fourth, 1.

We give the tables showing the value of articles of farm produce, manures and domestic manufactures, which are not embraced in the regular statistical tables of agriculture, and without which the returns would be incomplete

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MISCELLANEOUS ARTICLES OF FARM PRODUCE.

COUNTIES.	APRICOTS.		BEETS.		BROOM CORN.		CABBAGES.	CARROTS.		CHERRIES.		CLOVER SEED.		CRANBERRIES		CUCUMBERS.
	Bush.	Value	Bushels.	Value	Tons.	Value.	Value.	Bushels.	Value.	Bush.	Value.	Lbs.*	Value.	Bush.	Value	Value.
Albany,	.....	.....	213	$62	127	$25,080	$12	6,527	$1,893	14	$24	71½	$714	.....	.....	.....
Allegany,	.....	.....	49	20	.....	.....	.....	9,833	3,051	14	14	1	7	.....	.....	.....
Broome,	.....	.....	.....	.....	15½	3,174	.....	335	119	40	60	.....	.....	.....	.....	.....
Cattaraugus,	.....	.....	103	23	2½	390	.....	6,659	2,100	.....	.....	300	50	.....	.....	.....
Cayuga,	.....	.....	2,837	1,134	.....	371	112	15,872	3,788	1	4	1,325½	9,663	.....	.....	$75
Chautauque,	.....	.....	997	272	62	2,138	24	11,741	3,975	62½	124	10	89	.....	.....	.....
Chemung,	.....	.....	100	38	¼	52	.....	442	180	52½	84	6½	52	.....	.....	.....
Chenango,	.....	.....	.....	.....	.....	.....	.....	22,440	5,654	145	138	.....	.....	.....	.....	.....
Clinton,	.....	.....	157½	50	.....	.....	6	11,049	2,950	.....	.....	.....	.....	.....	.....	.....
Columbia,	2	$10	.....	.....	4½	825	.....	3,746	1,055	908	284	.....	.....	.....	.....	.....
Cortland,	.....	.....	156	19	1	206	.....	5,915	2,399	291½	354	6,540	1,090	.....	.....	.....
Delaware,	.....	.....	385	113	.....	.....	60	3,288	957	5	8	5	45	.....	.....	.....
Dutchess,	.....	.....	565	123	.....	57	.....	1,508	442	.....	429	13	121	.....	.....	.....
Erie,	.....	.....	430	175	.....	.....	1,891	20,716	5,936	66½	184	1,080	180	.....	.....	.....
Essex,	.....	.....	.....	.....	.....	.....	4	8,547	2,405	.....	.....	.....	.....	.....	.....	.....
Franklin,	.....	.....	15	3	.....	.....	.....	6,403	1,460	.....	.....	.....	.....	.....	.....	.....
Fulton,	.....	.....	166	38	1⅛	130	.....	7,025	1,900	.....	.....	.....	.....	.....	.....	.....
Genesee,	.....	.....	887	192	.....	.....	30	9,421	1,922	4	4	139	1,042	.....	.....	.....
Greene,	2	12	.....	.....	⅛	18	.....	1,230	626	10	36	.....	.....	.....	.....	.....
Hamilton,	.....	.....	.....	.....	.....	.....	.....	99	46	.....	.....	.....	.....	.....	.....	.....
Herkimer,	.....	.....	.....	.....	25⅛	2,805	.....	6,340	1,727	20	20	.....	.....	.....	.....	.....
Jefferson,	.....	.....	.....	.....	.....	150	.....	7,219	2,918	.....	.....	.....	.....	1	$4	.....
Kings,	.....	.....	.....	.....	.....	.....	.....	.....	190	.....	.....	.....	.....	.....	.....	.....
Lewis,	.....	.....	120	30	.....	.....	48	1,321	894	.....	.....	.....	.....	.....	.....	.....
Livingston,	.....	.....	1,570	389	70½	12,890	.....	5,314	1,616	19	20	68	462	.....	.....	.....
Madison,	.....	.....	15	4	5	704	10	5,029	1,447	125½	131	9	100	.....	.....	147
Monroe,	.....	.....	3,810	550	.....	.....	115	34,859	8,084	12	8	.....	.....	.....	.....	.....
Montgomery,	.....	.....	1,122	286	256½	44,846	.....	18,313	4,626	3	4	1,250	12,715	.....	.....	.....
New-York,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Niagara,	.....	.....	275	85	4⅜	470	60	22,359	5,377	277	222	316¼	2,266	.....	.....	.....
Oneida,	.....	.....	1,077	274	14½	2,129	35	18,801	4,757	36	55	4	48	.....	.....	.....
Onondaga,	.....	.....	2,375	767	.....	1,616	86	29,274	7,371	226	260	1,065¼	9,146	.....	.....	389
Ontario,	.....	.....	1,630	404	.....	221	.....	4,555	1,560	179	739	257	1,728	.....	.....	.....

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Orange,			1,673	692			71	2,187	970	90	98	12	94			
Orleans,			680	174		260	2	14,400	3,062	24	80	534	5,682			
Oswego,			1,271	339		560	64	20,169	5,380	258½	429					
Otsego,			105	30		5		10,227	2,611			447	4,511			
Putnam,					⅛	30		790	395							
Queens,							8,135	150	80							
Rensselaer,			100	37	48	9,745	12	7,430	2,297	89	199			3	8	
Richmond,							6,837				25			30	100	
Rockland,											73	13¾	117			
St. Lawrence,			79	20		10	15	25,726	6,718							
Saratoga,			655	191		1,874		10,289	3,380	63	123	2	20			
Schenectady,			1,185	221	727	133,970	20	6,289	1,828			41	431			
Schoharie,			840	217	134⅝	20,462		6,001	1,858	4	4	1,282½	11,602			
Schuyler,			87	28		280	41	3,758	1,145	54½	77	628¾	5,191			
Seneca,			680	150	¼	30		745	312	393	570	409	2,774			
Steuben,			160	20			158	1,973	735	91	171	45	274			
Suffolk,					1	48	500	10,066	3,603	24	32	165	1,311	8	27	
Sullivan,				5	¼	40	61	18	15	25½	27			45	135	
Tioga,			182	91		2,100	150	901	293							
Tomkins,			145	37				8,462	2,055	15	41	188⅛	1,671			
Ulster,			40	8		25	60	30	15	10	5	24	325			
Warren,								431	36	5	10					
Washington,			895	216	2½	265	47	9,904	2,617	30	56					
Wayne,			1,010	244	7⅛	750		12,960	3,248	15	28	369	2,817			
Westchester,			150	15			2	8,353	3,770		61					8,908
Wyoming,			341	98				10,064	2,318	20	22	44	327			
Yates,	3	2						774	205	55	85		1,132			
Total,	7	24	29,332½	7,884	1,509⅞	$268,726	$18,668	478,277	$132,372	3,787⅔	$5,372	16,662	$77,788	87	274	$9,619

Lbs. should have been *bushels*, except in the counties of Cattaraugus and Cortland.

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MISCELLANEOUS ARTICLES.—(CONTINUED.)

COUNTIES.	CURRANTS.		FEATHERS.		FRUITS. (Not specified.)		GARDEN SEEDS.		GRAPES.		MELONS.	MILLET.		ONIONS.		OSIER WILLOW	PEACHES.	
	Bush.	Val.	Lbs.	Val	Bushels.	Value.	Pnds.	Value.	Bushs.	Value.	Val.	Bushs.	Value.	Bushels.	Value.	Value.	Bushels.	Value.
Albany,	.....	....	....	....	4,515½	$7,118	.....	$2,589	155	$168	$110	.....	.....	1½	$1	$100	834½	$2,037
Allegany,	41	$46	....	....	41	50	.....	.....	.....	.....	.....	681	$697	345½	430	.....	147	258
Broome,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	164	266	20	20	.....	137½	220
Cattaraugus,	.....	....	15	$9	48	55	.....	.....	.....	.....	219	1,099	1,259	297	298	.....	647½	636
Cayuga,	.....	....	....	....	14	33	.....	.....	8	15	.....	.....	.....	720	397	.....	5,041	3,346
Chautauque,	32	22	....	....	172	206	.....	18,420	.....	301	267	157	169	567	446	.....	4,742	3,702
Chemung,	19	17	....	....	885	1,041	.....	.....	1	2	.....	2	3	10	10	.....	924	1,053
Chenango,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	174	344	20	20	.....	.....	.....
Clinton,	3	3	....	....	.....	.....	480	280	.....	.....	.....	103	98	52	64	.....	.....	.....
Columbia,	10	18	....	....	8,459	12,567	20,339	10,945	500	500	.....	.....	.....	2,560	1,381	133	1,999	4,224
Cortland,	13	9	....	....	36	27	.....	.....	12	60	.....	55	75	134	96	.....	55	74
Delaware,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	82	111	113	106	.....	38½	49
Dutchess,	68	46	....	....	.....	4,069	.....	.....	.....	1,857	624	30	30	57	82	.....	1,072	1,538
Erie,	2	3	....	....	753	868	192	92	.....	32	1,451	614	399	1,851	2,108	.....	2,616	1,604
Essex,	.....	....	....	....	29	41	.....	50	.....	.....	.....	.....	.....	55	77	.....	.....	.....
Franklin,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	61	61	15	15	.....	.....	.....
Fulton,	4	4	....	....	....	.....	.....	.....	.....	.....	.....	15	15	79	52	.....	.....	.....
Genesee,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	63	80	.....	3,506	1,229
Greene,	.....	....	....	....	7,134½	10,652	.....	.....	.....	.....	.....	15	25	.....	.....	.....	140	142
Hamilton,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Herkimer,	20	24	....	....	.....	.....	.....	.....	.....	.....	12	36	36	268½	228	.....	.....	.....
Jefferson,	.....	....	....	....	1,175	610	.....	.....	.....	.....	70	53	55	277	228	.....	.....	.....
Kings,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	30
Lewis,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	474	128	92	69	.....	.....	.....
Livingston,	.....	....	....	....	114	113	.....	.....	.....	.....	.....	8	16	93	91	.....	618	490
Madison,	.....	....	....	....	87	158	.....	.....	13	29	13	143½	25	64	54	.....	.....	.....
Monroe,	.....	....	....	....	.....	.....	.....	.....	23	37	37	.....	.....	441	324	.....	22,134	14,842
Montgomery,	46	48½	....	....	.....	15	.....	52	.....	61	.....	.....	.....	74	63	.....	.....	.....
New-York,	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	125	100	.....	.....	.....
Niagara,	.....	51	....	....	512	416	.....	2	86	436	20	192	187	850	692	.....	12,878	11,675
Oneida,	10	80	....	....	.....	.....	221	125	4	50	.....	150	150	626½	567	.....	.....	.....
Onondaga,	26½	39	....	....	.....	505	.....	.....	50½	148	10	106	170	468	284	18	1,165	1,087

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Ontario,					2,018½	1,800				1,120	8		15	66	73		3,073	1,785
Orange,	12	12				7,258				154				1,780	1,744		2,705	3,752
Orleans,			37	25	57	68					116			49	54		4,031	2,284
Oswego,	26	26			11,311				25½	74	200	65	88	425	394		2,244	1,982
Otsego,					2	15		10	2	2		52	52	58½	64		8½	9
Putnam,																		
Queens,							600	150	600	450							111	530
Rensselaer,	31	49½			101½	150		311	28	45				309½	134		392	535
Richmond,						110				42	400							
Rockland,						420								100	100		8	
St. Lawrence,						5		11			60	105	110	105	113			
Saratoga,	38	47				26			30	120	100			83	67			
Schenectady,								375						8	8			
Schoharie,					584	394						19	19	20	17		28	42
Schuyler,	24	24				704						286½	291	5	5		3,195	3,172
Seneca,	57	57									80			15	15		5,777	5,252
Steuben,						1,079				20		302	330	72	75		1,148	1,386
Suffolk,						250				300	150			239	202		1,330	2,469
Sullivan,					20	18		110				514½	553	27½	27		568	797
Tioga,			30	18							95	253	232	204	153		586	865
Tompkins,					175	200						12	12	92	84		1,919	2,871
Ulster,					2,420	5,591			10	40	600	60	63	23½	26		1,721	1,950
Warren,														12	12			
Washington,	21	36				31	1,600	5,637	6	32				346	272			
Wayne,					1,644	1,194		1,730	26	59		70	130	190	177		25,394	16,174
Westchester,	3	7				1,875				4,975	40			5	10		895	405
Wyoming,					190	234				202		285	279	432	427		397	402
Yates,					576	509			31	57		35	110				1,689	1,390
Total,	506½	669	82	52	43,074	60,475	23,432	40,889	1,610½	11,368	4,682	6,453½	6,503	15,026½	12,636	251	115,410½	96,288

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MISCELLANEOUS ARTICLES.—(CONTINUED.)

COUNTIES.	PEARS.		PLUMS.		QUINCES.		ROOT CROPS. (Miscellaneous.)		RUTA BAGA.		SAFFRON.*		STRAWBERRIES		Value of fruit & ornam'al trees.	Miscellaneous. †
	Bushs.	Value.	Bushs.	Value.	Bushs.	Value.	Bushs.	Value.	Bushs.	Val.	P'nds.	Val.	Bushs.	Value.		
Albany,	334½	$304	359	$694	68	$96	191	$22	.....	.....	.....	.....	.....	$1,089	.....	$9,670
Allegany,	52	39	1,692½	1,595	.....	.....	658	208	15	$4	.....	.....	.....	.....	$3,120	445
Broome,	11	11	14	18	.....	.....	50	19	20	8	.....	.....	.....	.....	.....	170
Cattaraugus,	39	41	146	115	.....	.....	685	223	.....	.....	.....	.....	.....	.....	.....	130
Cayuga,	395	375	15	34	3¼	3	.....	398	.....	.....	17	$11	.....	.....	1,200	655
Chautauque,	149	92	135½	130	168	228	1,812	557	.....	.....	.....	.....	.....	59	500	3,380
Chemung,	27	26	190	210	3	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,177
Chenango,	55	56	.....	.....	.....	.....	30	6	.....	.....	.....	.....	.....	.....	890	32
Clinton,	.....	.....	25	36	.....	.....	360	149	.....	.....	.....	.....	.....	.....	100	10,650
Columbia,	759	532	313	420	.....	.....	.....	.....	.....	.....	249	249	3	75	6,660	16,935
Cortland,	43	29	11	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	250	893
Delaware,	11	8	5	7	.....	.....	130	65	.....	.....	.....	.....	.....	58	.....	55
Dutchess,	278	339	1,780	2,722	720	326	890	411	400	100	.....	.....	4	16	3,969	3,108
Erie,	139	156	207	232	.....	.....	11,772	2,092	.....	.....	.....	.....	.....	1,289	3,415	9,851
Essex,	.....	.....	23	32	.....	.....	140	56	.....	.....	.....	.....	.....	.....	.....	227
Franklin,	.....	.....	.....	.....	.....	.....	3,078	152	....	.....	.....	.....	.....	.....	.....	267
Fulton,	6	3	.....	.....	.....	.....	1,508	411	140	30	.....	.....	.....	.....	.....	26
Genesee,	267	262	.....	.....	104	104	3,233	2,373	.....	.....	.....	.....	55	220	.....	5,419
Greene,	232	221	.....	.....	.....	.....	28	15	.....	.....	.....	.....	.....	.....	.....	.....
Hamilton,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Herkimer,	48	56	10	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	304	758
Jefferson,	.....	.....	121	121	.....	.....	5,751	1,835	.....	.....	797	635	.....	.....	603	3,893
Kings,	115	122	.....	.....	.....	.....	.....	50	.....	.....	.....	.....	.....	3,450	.....	3,115
Lewis,	1	1	1⅓	3	.....	.....	.....	20	.....	.....	.....	.....	.....	100	.....	2,650
Livingston,	38	31	24	22	.....	.....	2,810	744	.....	.....	.....	.....	28	131	444	1,756
Madison,	485	419	21	26	57	57	24	6	.....	.....	.....	.....	45½	198	15	2,143
Monroe,	240	300	4	4	182½	155	.....	.....	.....	.....	.....	.....	23½	173	.....	273,333
Montgomery,	77	103	125	179	24	30	1,330	316	.....	.....	428	359	.....	.....	9	1,288
New-York,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	387
Niagara,	47	50	87	94	52	52	125	31	50	.....	.....	.....	.....	14	25,507	447

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Oneida,	468½	760	27	50	63	85	137	46	7	3	50	50			7,291	4,095
Onondaga,	376	402	201	252	33	35	3,932	1,152			185	170		872	18,043	9,276
Ontario,	599	443	265	334			3,498	902						110	9,924	662
Orange,	69	37	146	467	22	34									9,860	5,902
Orleans,	136	132	100	99	26	24	1,909	415					*		2,519	33
Oswego,	450	432	129½	203	145	117					72	75	5	18		1,814
Otsego,	62½	45	82	133	22	44									300	2,118
Putnam,									1,500	613					2	
Queens,	60	60			5	5								3,774		193,555
Rensselaer,	341	255	341	593			160	65					2	18		630
Richmond,							600	225								3,363
Rockland,			5	5										3,544		15,994
St. Lawrence,			5	2					60	12					500	397
Saratoga,	94	143							710	178				137	10,200	1,303
Schenectady,			312	442												620
Schoharie,	8	4							80	23						18
Schuyler,			630	728			611	172							2,575	
Seneca,	378	289			55	55			10	5					5,000	251
Steuben,	4	4	397	403				164	119	50						407
Suffolk,	91	49	8	10	97	120	2,060	702					205	563		377
Sullivan,	134	103			7	7									1,480	
Tioga,	31	31	22	24											1,300	125
Tompkins,	127	97	4	6			506	115						100	9,800	355
Ulster,	111	84	3	3	7½	9									498	2,358
Warren,			144	113												
Washington,			75	140	1	2		49								407
Wayne,	156	320	5	6	170	164	531	177							14,610	3,127
Westchester,				80			5,368	2,236						264	1,100	3,595
Wyoming,	70	99	212	174			520	124								561
Yates,	15	10	281	244											400	6,194
Total,	7,629½	$7,375	8,604	$11,232	2,035½	$1,696	54,437	$16,703	3,111	$1,026	1,798	$1,549	871	$16,262	$142,328	$611,397

Total value, ... $1,421,750.

* Dried blossoms of the *Carthamus tinctorius*, used chiefly in dyeing.

† The miscellaneous column includes several very considerable products that were reported together in such a manner that they could not be separated, as "fruits and grain," &c. The following items are included in this column: *Medicinal Herbs*—Albany, $500; Columbia, 59,920 lbs., $13,800. *Pop Corn*—Schenectady, 1,000 bushels, $1,000. *Sweet Corn*—Richmond, $75. *Sweet Potatoes*—Ontario, 11 bushels, $21; Richmond, 90 bushels, $105; Wayne, 6 bushels. *Teasels*—Cattaraugus, $60; Cayuga, $62; Oneida, $928; Onondaga, $6,908. *Tomatoes*—Cayuga, $2; Dutchess, $5; Erie, $200; Kings, $3,115; New-York, $387; Richmond, $3,198; Suffolk, $20. *Wood*—Oneida, 4 tons, $400.

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QUANTITY AND VALUE OF SPECIAL MANURES USED.

COUNTIES.	ASHES.		BONE DUST.		GUANO.		GYPSUM.		LIME.		PHOSPHATE OF LIME.		SALINE COMPOUNDS.		MISCELLANEOUS.*
	Bush.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Bushels.	Value.	Tons.	Value.	Bush.	Value.	Value.
Albany,	200	$20	½	$35	43¾	$2,172	1,137⅝	$8,573	1,000	$150	1	$56	.....	.....	$5,292
Allegany,	50	6	.....	.....	9	514	422	2,810	51	15	¾	45	.....	.....	50
Broome,	500	63	.....	.....	2	120	337½	4,409	43	15	.....	.....	.....	.....	.....
Cattaraugus,	140	11	.....	.....	¼	30	51¼	526	.....	.....	.....	.....	.....	.....	8
Cayuga,	50	10	.....	.....	¾	45	1,591½	5,027	5,046	911	.....	.....	.....	.....	263
Chautauque,	18	2	½	11	.....	.....	241¼	1,062	61	24	.....	.....	.....	.....	128
Chemung,	.....	.....	.....	.....	.....	.....	926½	2,874	160	42	1	55	.....	.....	.....
Chenango,	.....	.....	.....	.....	.....	.....	1,414½	6,139	.....	.....	½	8	.....	.....	100
Clinton,	200	22	.....	.....	.....	.....	268¼	2,189	.....	.....	.....	.....	.....	.....	36
Columbia,	.....	20	.....	.....	19½	745	1,337¼	11,837	20	1	1½	66	.....	.....	11
Cortland,	121	15	.....	2	.....	.....	528¾	2,558	15	3	.....	.....	.....	.....	495
Delaware,	.....	89	.....	5	¼	15	225¼	2,442	237	142	.....	.....	.....	.....	.....
Dutchess,	1,902	130	.....	.....	70	3,406	2,630	19,051	.....	.....	7	350	.....	.....	2,087
Erie,	180	23	.....	.....	½	.....	545	2,360	.....	400	.....	3	.....	.....	351
Essex,	.....	.....	.....	.....	.....	.....	207	2,985	.....	40	.....	.....	.....	.....	68
Franklin,	10	2	.....	.....	.....	.....	581¼	669	.....	.....	.....	.....	.....	.....	30
Fulton,	70	13	.....	.....	4	247	477¾	2,508	.....	.....	½	22	.....	.....	.....
Genesee,	40	5	.....	.....	.....	.....	1,197¾	3,852	159	25	.....	.....	.....	.....	122
Greene,	.....	.....	.....	.....	¼	8	217¾	2,300	.....	.....	.....	.....	.....	.....	1,194
Hamilton,	.....	56	.....	.....	.....	.....	1	7	.....	.....	.....	.....	.....	.....	.....
Herkimer,	.....	90	.....	.....	1½	133	2,076¾	8,899	315	110	½	18	.....	.....	120
Jefferson,	.....	.....	.....	.....	.....	.....	1,081	4,016	.....	.....	.....	.....	.....	.....	95
Kings,	1,780	172	.....	150	45¼	2,615	.....	.....	.....	.....	.....	.....	.....	.....	21,491
Lewis,	.....	40	.....	.....	3	150	157	1,003	155	21	.....	.....	.....	.....	.....
Livingston,	.....	.....	.....	.....	1½	63	2,459¾	10,335	.....	.....	.....	1	.....	.....	26
Madison,	1,997	76	.....	.....	1	68	1,618¼	5,816	5,340	638	.....	.....	.....	$9	101
Monroe,	.....	15	.....	.....	4½	207	2,637½	8,653	500	129	.....	.....	.....	.....	2,429
Montgomery,	.....	.....	.....	.....	¾	36	1,581	7,081	.....	.....	.....	.....	.....	.....	363
New-York,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Niagara,	.....	.....	.....	.....	.....	.....	680½	3,254	.....	.....	.....	.....	.....	.....	.....
Oneida,	2,170	179	.....	42	7½	546	1,005¼	4,067	760	124	.....	3	30	12	1,228
Onondaga,	240	20	.....	60	½	26	2,894½	7,800	248	20	.....	.....	.....	46	16
Ontario,	.....	.....	.....	35	1	53	2,882	10,816	.....	28	.....	.....	.....	.....	148

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Orange,	330	38	.....	101	27	1,581	1,596	12,504	1,485	310	.....	.....	.....	.....	1,302
Orleans,	385	43	.....	.....	.....	.....	950	5,325	1,607	76	.....	.....	280	94	66
Oswego,	2,365	247	.....	.....	$\frac{1}{2}$	8	497$\frac{7}{8}$	2,095	384	74	.....	.....	.....	.....	.....
Otsego,	.....	134	.....	.....	1	51	1,920	13,552	1,300	349	.....	.....	.....	.....	1,115
Putnam,	200	25	.....	85	27$\frac{1}{2}$	1,122	616	5,100	300	15	.....	.....	.....	.....	95
Queens,	.....	.....	.....	.....	1,206$\frac{1}{2}$	60,274	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rensselaer,	.....	35	$\frac{1}{2}$	15	14$\frac{1}{2}$	726	1,826	12,970	5,993	213	$\frac{1}{2}$	8	.....	.....	856
Richmond,	.....	.....	.....	60	12$\frac{1}{2}$	708	.....	.....	.....	.....	$\frac{1}{2}$	27	.....	.....	130
Rockland,	.....	.....	.....	.....	$\frac{1}{2}$	5	.....	.....	5,300	130	.....	.....	.....	.....	4,437
St. Lawrence,	.....	100	.....	.....	1$\frac{1}{2}$	58	278$\frac{1}{2}$	2,106	125	16	.....	.....	.....	.....	10
Saratoga,	2,362	430	.....	.....	42	1,717	2,188	12,630	2,975	366	$\frac{1}{2}$	9	.....	.....	2,296
Schenectady,	.....	.....	.....	.....	6	291	543$\frac{3}{4}$	2,514	.....	.....	.....	.....	.....	.....	290
Schoharie,	.....	.....	.....	.....	$\frac{1}{2}$	13	740$\frac{3}{4}$	5,568	200	50	.....	.....	.....	.....	.....
Schuyler,	.....	.....	.....	.....	.....	.....	1,493$\frac{1}{4}$	6,550	284	70	.....	.....	.....	.....	140
Seneca,	1,061	127	.....	.....	1$\frac{1}{2}$	78	1,470	3,310	2,263	282	.....	.....	.....	.....	386
Steuben,	.....	.....	.....	.....	$\frac{1}{2}$	43	2,540$\frac{1}{2}$	12,226	200	30	.....	.....	100	432	.....
Suffolk,	50,632	7,879	.....	11,721	1,059$\frac{1}{4}$	52,015	3	16	15,735	742	21	1,055	.....	.....	120,756
Sullivan,	32	4	.....	.....	.....	.....	37	368	45	16	$\frac{1}{2}$	8	.....	.....	190
Tioga,	20	2	.....	.....	$\frac{1}{2}$	6	814$\frac{1}{4}$	3,987	6	1	.....	.....	.....	.....	45
Tompkins,	65	7	.....	.....	$\frac{1}{2}$	5	1,303$\frac{1}{4}$	4,826	546	78	$\frac{1}{2}$	15	.....	.....	352
Ulster,	769	152	.....	.....	5$\frac{1}{2}$	258	365$\frac{1}{4}$	2,524	48,676	2,266	25	343	.....	.....	3,151
Warren,	.....	14	.....	.....	.....	.....	357	1,942	5	2	.....	.....	.....	.....	46
Washington,	.....	.....	.....	.....	5$\frac{1}{4}$	306	3,219$\frac{3}{8}$	19,401	212	51	3$\frac{1}{8}$	174	21	8	135
Wayne,	106	12	.....	5	1	60	1,632	5,727	44	9	.....	.....	.....	.....	620
Westchester,	.....	.....	.....	4,112	172	7,064	426	2,374	7,700	415	8	848	.....	.....	9,155
Wyoming,	310	35	.....	.....	$\frac{1}{2}$	8	649	3,400	.....	.....	.....	.....	.....	.....	336
Yates,	143	20	.....	.....	$\frac{1}{2}$	9	1,973$\frac{1}{2}$	8,441	30	7	.....	.....	.....	.....	.....
Total,	67,498	10,359	$\frac{1}{8}$	16,439	2,800	137,607	60,811$\frac{1}{8}$	204,773	110,022	8,409	70$\frac{3}{4}$	3,114	431	601	182,162
Total value of special manures,															$663,464

* This column embraces such manures as were only mentioned as "miscellaneous," and those that were reported together, in such a manner that the quantities and values could not be ascertained separately.

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MISCELLANEOUS DOMESTIC MANUFACTURES.

COUNTIES.	BASKETS.		BED SPREADS.*		BLANKETS.		BROOMS.		CARPETING.†		CLOTH. Not specified.		COVERLIDS.		CURRANT WINE.		DRIED FRUIT.	
	No.	Value	No.	Value.	No.	Value	No.	Value.	Yards.	Value.	Yards.	Value.	No.	Value.	Galls	Value.	Bush.	Value.
Albany,			21	$10					393	$142					12	$12		
Allegany,	40	$24	11	68	2	$10			4,938	2,291	6		2	$16				
Broome,																		
Cattaraugus,			5	29	10	6			4,363¼	2,170	9	$14	22	70			196¼	$492
Cayuga,			4	21			1,140	$140	4,899	1,992	19	12	15	112			8,659	7,339
Chautauque,			83	337	27	44			16,547	7,149	161	53	23	74			222	248
Chemung,					42	27			594	282	30	21						
Chenango,					24	26			7,343½	2,770	81	40					767	498
Clinton,									495	248								
Columbia,	3,400	1,700							3,922	1,655	113	89	6	35				
Cortland,	100	40	1	8	1	3			5,010	1,662			16	39				
Delaware,			9	53					1,761	684								
Dutchess,									1,735	476							3	11
Erie,					2	10			6,981	2,950			11	59			400	516
Essex,	60	30							631	770								
Franklin,																		
Fulton,									1,798	659			2	25				
Genesee,			2	2					4,025	1,902							50	58
Greene,									1,990	803			3	15	29	26	72	117
Hamilton,									32	12								
Herkimer,									4,540	2,271			2	20				
Jefferson,	160	80	8	30					7,072	3,925								
Kings,																		
Lewis,			5	28					2,027	1,058								
Livingston,									1,983½	1,042			2	82			571	1,074
Madison,			2	16	70	77			7,242½	3,054			5	41			56	74
Monroe,			31	102					8,398	3,882								800
Montgomery,		200			30	20			2,615	1,104			88	54	300	300		
New-York,																		
Niagara,					2	8			4,520½	2,480			9	80			157	404
Oneida,							1,700	320	6,689	2,478	678	422					5	7
Onondaga,	100	20	4	84	12	53	350	70	8,390½	3,210			8	66				
Ontario,							700	120	5,030	2,783							490	545

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Orange,									2,705	1,385							82	61
Orleans,					25	55	522	97	4,958	2,451			6	40			923	1,350
Oswego,					8	23			9,737	4,498							36	42
Otsego,	160	80	4	12	2	20			6,060	3,289			6	22			396	693
Putnam,																		
Queens,																		150
Rensselaer,					18	9			3,815½	2,028	266	73	3	30				
Richmond,																		
Rockland,	54,000	907																
St. Lawrence,			10	57	10	28			3,060	1,184	40	10	13	13	113	113		
Saratoga,	4	3							1,955	865			1	6	10	10		
Schenectady,									866	382			3	15				
Schoharie,									2,531	1,236	60	30	14	56			318	441
Schuyler,			3	56					1,698	756	8	8	2	16				3,163
Seneca,									2,821	1,365			2	14			193½	267
Steuben,			4	32					5,195	2,669							200	242
Suffolk,							300	75	2,592	1,221								
Sullivan,					2	3			1,823	749			14	56			26	114
Tioga,	1,000	25	4	30	81	141			6,114	2,883	23	12	6	54				22
Tompkins,	465	180							2,500	956							19½	90
Ulster,			17	63					4,186	1,970	15	2						
Warren,									1,315	692								
Washington,			6	8					4,834	1,768			3	25				
Wayne,							60		9,122	3,574			5	39			19,550	22,474
Westchester,					4	4			790	410								
Wyoming,			8	49	25	20			3,977	1,776							451	771
Yates,							250	50	4,506¼	1,923							697	1,783
Total,	59,489	8,289	237	1,107	401	587	4,962	952	218,617½	96,115	1,509	781	299	1,154	464	461	34,492½	43,840

* Including quilts, patchwork, and other bed coverings, excepting coverlids.
† Mostly rag carpeting.

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MISCELLANEOUS DOMESTIC MANUFACTURES.—(CONTINUED.)

COUNTIES.	GLOVES.		HATS.		MATS.†		MITTENS.‡		OIL OF PEPPERMINT.		PLAIDS.		SOCKS.§		YARN.‖		Miscellaneous.¶
	Pairs.	Value.	No.	Value.	No.	Value.	Pairs.	Value.	P'nds.	Value.	Yards.	Value.	Pairs.	Value.	Lbs.	Value.	
Albany,													5,239	$1,314	100	$74	$2,747
Allegany,	2	$1	241	$61			322	$174					2,746	936	133	106	470
Broome,																	
Cattaraugus,	60	30	1,245	308			503	242			11	$5	4,680	1,588	80	24	1,630
Cayuga,							168	73					761	270	196	203	363
Chautauque,			851	272			151	139					2,595	831	238	185	265
Chemung,													5	2	271	300	13
Chenango,			721	162									2,382	586	15	12	819
Clinton,			196	67			184	88					11,483	3,452	131	131	117
Columbia,					350	$250											3,945
Cortland,			18	5			141	107					6,727	1,775	14	14	252
Delaware,							9	8					5,232	1,491	121	114	
Dutchess,													333	120	295	300	116
Erie,	30	21	748	1,042	70	70	828	301					21,426	6,192	542	425	332
Essex,			34	16			32	25					1,008	439	170	171	307
Franklin,																	
Fulton,							59	35					258	107			275
Genesee,			480	14			138	60					1,075	422	70	113	212
Greene,			48	10									1,868	592		6	
Hamilton,													13	6	30	28	
Herkimer,			78	25			663	224					1,762	499	99	99	
Jefferson,							5	3					2,258	771	15	13	6,253
Kings,																	
Lewis,							87	44	672½	$2,929			140	52			31
Livingston,							22	45					531	220	167	166	
Madison,	3	2											1,966	640			206
Monroe,							6	2					1,040	468			258
Montgomery,											38	24	347	105	70	60	
New-York,																	
Niagara,							1	1					557	229	160½	157	32
Oneida,			30	6			968	549					1,384	511	300	249	3,400
Onondaga,				40			381	191					1,477	594	105	78	317

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Ontario,							67	39		296			1,227	470	42½	33	70
Orange,													149	193	230	255	598
Orleans,	79	90						25					792	300	72	72	
Oswego,			26	10			1,205	1,210					3,768	1,270	475	473	57
Otsego,			565	137			307	152					10,078	2,595	125	123	1,302
Putnam,																	
Queens,																	
Rensselaer,													229	88			6
Richmond,																	4,500
Rockland,																	
St. Lawrence,			442	140			53	24					14,042	3,861	160	160	1,036
Saratoga,			77	26			481	372					9,404	3,281	27	27	76
Schenectady,													2,563	683	94	64	
Schoharie,											57	38	4,997	1,405	61	39	3
Schuyler,							216	106			20	12	855	438	142	128	186
Seneca,							16	12	40	150			213	90	143	143	30
Steuben,							4	4					3,498	1,376	117	123	1,273
Suffolk,													68	29			
Sullivan,							70	52					1,362	480	444	424	15
Tioga,				253				76					4,277	1,115	20	20	292
Tompkins,			266	68			96	51					8,657	2,304	155	153	155
Ulster,											180	116	7	2	25	25	928
Warren,			100	40			401	205					3,139	1,036	8	8	72
Washington,													162	54			450
Wayne,			200	80			663	224	2,399	9,645			1,216	426	117	117	48
Westchester,													112	44			
Wyoming,			460	38			220	190					2,349	615	286	256	2,740
Yates,							5	2					184	70	48	48	30
Total,	174	144	6,798	2,820	420	429	8,506	5,054	3,111	13,020	306	195	152,645	46,297	6,070	5,719	36,224

Total value, $258,354.

* Chiefly straw, palm leaf, and other braided summer hats.
† Sometimes specified as "table," or "floor" mats.
‡ Generally specified as "woolen" or "fringe" mittens, and occasionally as "buckskin" or other materials.
§ Mostly specified as "woolen socks," "hose," &c.
‖ Commonly reported as "woolen yarn," which is believed to be the term intended in nearly every instance.
¶ This class includes those of which the kind and quantity were not given, or which were so reported together that they could not be separated as "mittens and yarn."

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The whole population of the State is 3,466,212; number of farmers, 321,930; owners of land, 361,013.

We give the position in which the several counties stand in relation to the leading crops and agricultural productions of the State. The season of 1854 was one of the most unfavorable known, for most of the crops. The severe drought of that year affected the crops so as to cause a diminution of from 30 to 50 per cent in most of them, while the crop of wheat was very seriously diminished by the ravages of the wheat midge, (*Cecidomyia tritici;*) in many sections not a half a crop was gathered, and in not a few instances the crops were not harvested. The average of the crops, as appears from the census, does not give a fair estimate of the crops of the State had the season been an ordinary one; and it is safe to say that the crops of the State per acre would have shown a considerably larger yield than at any former period since the censuses have been taken, had not these casualties existed. The evidence of the diminution of the crops by drought and insects, as furnished by the returns, shows this, and the assurances we have from the most intelligent farmers in the State, fully confirm it.

In giving the counties which show the largest yield, we begin with winter wheat, of which Livingston county gives 1,094,779 bushels; (Monroe, 810,363; Genesee, 760,461; Niagara, 589,911; Ontario, 528,488.) Spring wheat, Jefferson, 428,672⅞; (St. Lawrence, 295,464.) Oats, Onondaga, 1,015,227½; (and several others over half a million.) Rye, Columbia, 445,136. Barley, Jefferson, 392,684. Buckwheat, Schoharie, 169,078. Corn, Onondaga, 907,453; (Monroe, 805,811; Wayne, 756,677¼; Oneida, 732,294½.) Potatoes, Washington, 767,285. Peas, St. Lawrence, 69,016. Beans, Orleans, 40,185¾. Hay, St. Lawrence, 139,400 tons. Grass seed, Jefferson, 13,601¾. Turnips, Suffolk, 104,183½. Flax, Montgomery, 1,016,929 lbs. Flax seed, Washington, 23,003. Hops, Otsego, 3,122,258½ lbs. Tobacco, Onondaga, 554,987 lbs. Apples, Oneida, 634,262 bushels. Market gardens, Queens, $337,503. Maple sugar, St. Lawrence, 513,913 lbs. Molasses, Lewis, 4,698½ gals. Wine, Orange, 2,173 gals. Honey, Oneida, 138,475 lbs. Neat cattle, St. Lawrence, 96,408. Cows, St. Lawrence, 52,161. Butter, same, 4,268,809 lbs. Cheese, Herkimer, 9,068,519 lbs. Milk, Orange, 4,553,514 gals. Horses, St. Law-

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rence, 20,261. Mules, N. Y., 256. Swine, Orange, 40,584. Sheep, Ontario, 132,725; wool, same, 609,075 lbs. Poultry, Queens, $69,114; eggs, Dutchess, $68,913. Fulled cloth, St. Lawrence, 19,102 yards; flannel, same, 29,178 yards. Linen, Schoharie, 7,376 yds. Cotton and mixed cloth, St. Lawrence, 36,640 yards.

The miscellaneous crops named in the tables annexed, and which are not named in the list of agricultural products, amounted to $1,421,700, of which, broom corn, Schenectady had $133,970.

The total value of special manures reported, was $663,464, of which guano, $137,607. The counties using the largest amount, were Queens, 1,266½ tons, $60,274; Suffolk, 1,059½ tons, $52,015; Gypsum, $304,773, generally used throughout the State, Dutchess county having the largest quantity, 2,630 tons, $19,051. Bone-dust, $16,439, Suffolk using $11,721 in value. Ashes, $10,359, Suffolk using 50,622 bushels, value, $7,879. Lime, $8,409, Ulster using 48,676 bushels, $2,266. Miscellaneous mixed manures, $182,163, Suffolk using $120,756; Kings, $21,491.

Miscellaneous Domestic Manufactures.—The total value of these manufactures, as returned, is $258,354. The article of most value is carpeting, $96,115, of which Chautauque county has the largest quantity, 16,547 yards, value, $7,149. Most of the counties in the State have returns in this column. The next largest article, socks, mostly woolen, 152,645 pair, $46,297, of which Erie county has the largest number, 21,420, $6,192. Dried fruits amount to 34,492½ bushels, $46,846, of which Wayne county has 19,550 bushels, value, $22,474.

The residue of this table has small amounts, the miscellaneous class of unclassified productions being $36,224.

We had hoped the census would have given the statistics in such a form that the products per cow for butter and cheese could have been ascertained; but it will be seen that it is impracticable to ascertain from the census anything reliable. The number of cows are given, the quantity of butter and cheese made, and the gallons of milk sold; but it was found impracticable to separate the cows, so as to ascertain the number devoted to different purposes. We are assured, however, from the returns we are receiving from dairies in different portions of the State, that there is a steady progress going on, and that the quantity of cheese and

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butter per cow is considerably larger than at the census of 1850, which gave as the estimate, 128 lbs. of butter, and 110 lbs. of cheese per cow.

The census was the most comprehensive one that has ever been taken in our State, and is more extensive than any previous census in this country. To the Secretary of State, Mr. Leavenworth, under whose directions the tables were prepared, great credit is due. He endeavored to include everything that would develop the resources of the State, and although he was unable fully to carry out his plans, still, the work as printed and published, is far more perfect than any previous one. To Dr. F. B. Hough, who has superintended the entire work from its commencement, the public are greatly indebted for the manner in which it has been carried out; and we are satisfied that no other man in our State could have been selected who would have discharged the duties connected with the work more acceptably than he has. A foundation has been laid, which, if pursued hereafter, will secure to our State at the next census all that can reasonably be expected from a work of this kind.

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THIRD REPORT

ON THE

NOXIOUS AND OTHER INSECTS

OF THE

STATE OF NEW-YORK.

By ASA FITCH, M. D.,

ENTOMOLOGIST OF THE NEW-YORK STATE AGRICULTURAL SOCIETY.

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Executive Committee New-York State Agricultural Society:

In presenting this, my third Report, I would observe that the researches in which, pursuant to your instructions, I am occupied, embrace a field of vast extent. These researches, for the present, have a particular reference to those insects which are injurious—the branch of science which is termed Economical Entomology. They thus include a consideration of all those insects which are detrimental,

1. To fruit trees.
2. To forest trees.
3. To the grass crop of meadows and pastures.
4. To grain and other field crops.
5. To the kitchen garden.
6. To the flower garden and greenhouse.
7. To domestic animals.
8. To man, molesting (1.) his person, (2) his household property, such as furniture, clothing, stored provisions, &c.

These several heads will, I believe, embrace every object which legitimately pertains to this branch of science; and this, in my apprehension, is the most simple and appropriate division, the

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best classification of its subjects which can be made. And when we call to mind how many insect depredators are to be found upon a particular kind of tree, or a single one of our grain crops, it will at once be perceived that the number of objects to be examined under all of the several heads above specified, will be truly immense. Many years will of course be required to investigate each one of these sufficiently to render such a full and exact account of it as the advanced state of knowledge at the present day demands—an account which will give to the reader a complete view of the history and economy of each species—such an acquaintance with them, in short, as is requisite to enable those who are suffering from these pests to devise the most suitable and effectual modes for combatting them.

In the meantime, as the habits of a multitude of these depredators have already been investigated more or less fully by different observers, it is important that the information relating to them, which is now scattered through a number of different works, many of which are inaccessible to those who are most deeply interested in the premises, should be brought together in a condensed form, so as to present a full view of this subject. More than a century ago, the celebrated naturalist Reaumur, expressed the wish that those observers who are laboring to elucidate the history of insects, would prepare and give to the world lists of all the kinds which feed upon each particular tree and plant. But in this country, where so little accurate knowledge of our insects is diffused among the population, in addition to its name, an indication of the external appearance and habits of each species is a great desideratum. Our agricultural periodicals are making frequent allusion to this as a most important want at the present time. And I have hence thought that, in addition to the original matter which I have to report as the fruit of my own investigations, I could not render a more valuable service than that of posting up this subject in such a manner as to present a map as it were of the entire field. I therefore propose, in this and the succeeding reports, to pass over this whole ground, giving every American insect which is at present known as being an injurious species, arranging them in their regular order under the several heads above specified. I design to give the common and the scientific name of each species, with the name of the order and family to

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which it pertains, followed by a brief statement of (1st) the particular injury which each species does and the time of the year when it commits its depredations, (2d,) the appearance of the depredator, and if it be a worm or larva, add to this (3d) where it secretes itself to repose during its pupa state, and (4th) the appearance which it finally assumes when it comes out in its perfect form; and if it be a species the history of which has already been published, give (lastly,) a reference to the work where the most particular account of it and the remedies for opposing it will be found. I endeavor in each instance to render this account as succinct as possible, and at the same time sufficiently plain and definite to enable any one, when he meets with an injurious insect, to ascertain its name. As it is the leading design of these Reports to impart information to common readers, I aim to use such terms and give such comparisons as will make the subject most clear to their comprehension, even at the risk in some instances of appearing inelegant and uncouth.

Many insects, it is well known, feed upon several different kinds of vegetation. The account of these is introduced under the particular tree or plant to which each appears to be most attached and on which it occurs in the greatest abundance, and under each of the other trees or plants on which it is known to feed, its name only is given, with a reference to the place where the description of it will be found, the species being numbered in a continuous series to facilitate such references. A large portion of the insects which now infest our fruit trees, originally subsisted upon the native forest trees of this country, and many of these still occur in their original haunts in greater numbers than in the new situations to which circumstances have obliged them to resort. But as such insects will be much more frequently noticed upon fruit trees, and are more important to us in consequence of the depredations they are liable to commit upon the trees of this class, I place the description of them under this head. The present Report thus completes the account of all the insects at present known to infest our fruit trees, both cultivated and wild, the latter embracing the chestnut, hickory, butternut and hazelnut, which I class as fruit rather than forest trees, for the reason that they are more valued through our country generally, in consequence of the fruit

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which they yield, than for the timber and fuel which we obtain from them.

Many things which are most interesting and remarkable are brought to my view, in the researches in which I am occupied, and I sometimes think there is no kind of mischief going on in the world of nature around us but that some insect is at the bottom of it. Certain it is that these little creatures, seemingly so insignificant and powerless as to be unworthy of a moment's notice from any body but the curious, occupy a most important rank in the scale of creation, and on every side of us their performances are producing most important results, tending probably in an equal degree to our benefit in one direction as to our detriment in another. We are accustomed to read with wonder the accounts which authors give of the singular habits and amazing achievements of these creatures in foreign lands, little suspecting that in the fields and woods around our own dwellings, operations are constantly going on which are every whit as interesting and marvellous. Since my last Report was presented, I have succeeded in completing the history of an insect whose deeds are as astonishing as anything on record in the annals of science. It is well known that certain insects have been created apparently for the sole purpose of preying upon other insects, and thus restraining them from becoming excessively multiplied. But I am not aware of any discovery hitherto made indicating it to be the office of any creature of this class to check the undue increase of any of the higher orders of animals. The fact has long been known of the squirrels of this country that the males are very frequently emasculated, but how this deformity is produced has all along been involved in doubt, it being the current popular supposition that some of these animals seize and overpower their unfortunate fellows and with their sharp teeth reduce them to the condition of eunuchs. But I am now prepared to report a fact which will probably set this mooted point to rest. I find we have a species of fly, analogous to the bot fly of the horse and the gad fly which produces the warbles in the backs of cattle, the grub of which resides in the scrotum of the squirrel and consumes its testicles. How surprising that an insect should have been called into existence for the express purpose of executing such a singular work as this!

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And in connexion with the investigations which I am pursuing other facts similarly valuable as shedding additional light upon this branch of the natural history of our country are frequently elicited, which, however, have no relation to the subject of noxious insects. I have therefore appended a few supplementary pages to the present report, in which the more important items of this extraneous matter is presented. Respectfully submitted,

ASA FITCH.

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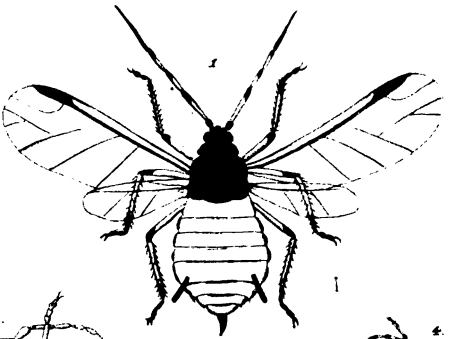
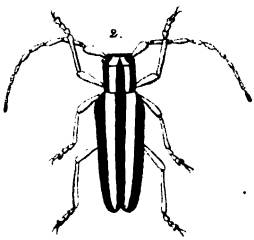
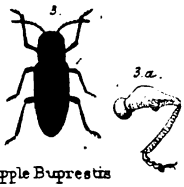
PLATE 1



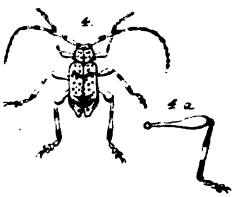
Apple Aphis, male.



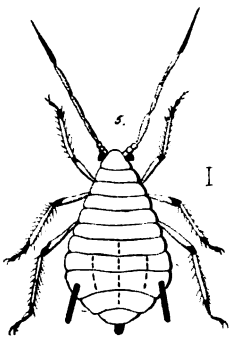
Apple tree borer



Apple Buprestis



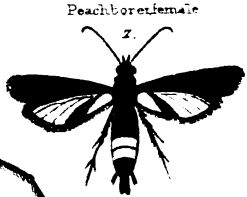
Prickly Leptostylus.

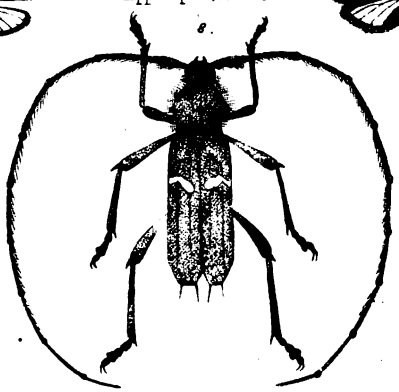


Apple Aphis, female.

Peach borer, male.

Peach borer, female





Belted long horn

Lith of C. Van Benthuysen, Albany

INSECTS INFESTING FRUIT TREES.

THE APPLE.—*Pyrus Malus.*

AFFECTING THE ROOT.

1. APPLEROOT BLIGHT, *Pemphigus Pyri*, Fitch. (Homoptera. Aphidæ.)

Wart-like excrescences growing upon the roots, sometimes of an enormous size; containing in their crevices exceedingly minute pale yellow lice, often accompanied with larger winged ones, having their bodies covered with a white cotton-like matter.

The mature, winged insect, a black fly with a dull greenish abdomen and the wings transparent but not clear and glass-like, with a faint smokiness at their tips, in the cell or space inclosed by the last of the four oblique veins. Length to the end of the wings nearly or quite a quarter of an inch, (0.25.) See Transactions of the New-York State Agricultural Society, 1854, page 709.

AFFECTING THE TRUNK.

Worms beneath the bark, mining cavities in the outer sap wood and boring holes in the heart wood.

These are the most pernicious enemies which the apple tree has, whole orchards of young trees, if neglected, being almost sure, of late years, to become suddenly infested and destroyed by one or more of these insects.

2. APPLE TREE BORER, *Saperda bivittata*, Say. (Coleoptera. Cerambycidæ.) [Plate I, fig. 2.]

A large cylindrical white footless grub, rather broadest anteriorly, its head chestnut brown, its mouth black. Excavating

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irregular roundish or long and narrowish flat shallow burrows, immediately under the bark, at the crown of the root, where the worm lies through the first winter; then boring upwards in the solid wood about three inches, and reposing here through the second winter, the perfect insect coming out of the tree the following June.

A cylindrical butternut-brown beetle, hoary white beneath, and with two broad milk white stripes above, running the whole length of its body. Length 0.60 to 0.75.

A full account of this species will be found in my first report, Transactions N. Y. State Agricultural Society for 1854, p. 715. Having recently enjoyed ample opportunities for inspecting the work of this borer, I find it is more variable in its habits than previous information had led me to suppose. The account given by Dr. Harris, the best authority we have hitherto possessed on subjects of this kind, has caused a very imperfect and in some respects erroneous idea of its operations to become widely prevalent in our country. He says, "The grub, with its strong jaws, cuts a cylindrical passage through the bark, and pushes its castings backwards out of the hole from time to time, while it bores upwards in the wood, penetrating eight or ten inches in the tree." But, as I have heretofore stated, it is when the worm first hatches from the egg that it mines its way through the bark, and is then so minute that the hole it makes is no larger than the perforation of a pin, and often becomes wholly closed and obliterated. And the worm does not now penetrate into the wood, but feeds upon the inner layers of the bark and the outer layers of the sap-wood, for about a twelvemonth, and till it is half grown to maturity, excavating hereby a shallow flat cavity between the bark and the wood, which cavity extends some two or three inches up and down and is half as broad, but is commonly very irregular in its form, in consequence of several worms working in the same tree and avoiding any encroachment upon each other. This cavity is almost invariably found stuffed full and densely packed with the sawdust-like castings or chips of the worm, a small quantity of which is commonly protruded to the outside of the bark, sometimes through a natural crack formed by the bark becoming dead, dry and con-

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tracted, sometimes through one or more small orifices which appear to be gnawed by the worm. But I have met with many instances where none of this powder was protruded, the blackened and slightly depressed surface of the bark being the only indication of the mischief that was going on beneath. And not unfrequently the worm eats downwards, under the bark of the root, to a distance of two to four inches below the surface of the ground, instead of being always at or slightly above the surface, as previous accounts have implied. And it is of course impossible for any castings to be protruded from this part of its burrow, as the soil is firmly pressed against and moulded to the root. And where this powder appears externally, it commonly has the aspect not of having been thrust out by the worm, but of having crowded itself out, from the mass under the bark swelling by being dampened by rain soaking through the dead bark and saturating it.

The worm is almost always found at some part of the outer edge of its burrow, where it is lying apparently dormant, crowded and tightly wedged between the bark and the wood. Like most other larvæ, this moults, and its cast skin will sometimes be found among the dust in the burrow. At length, in the course of the second summer, when it has grown to half or three-quarters of an inch in length and its jaws have become sufficiently strong for the work, it begins to bore a cylindrical passage upward in the solid wood, making hereby a secure retreat, in the interior of the tree, in which to lie and sleep during its pupa state. It is not till just the close of the larva period of its life that it completes this cylindrical burrow by extending it onwards and obliquely outwards to the bark. It then stuffs the upper end of this passage with sawdust-like powder, and its lower end with short fibres of wood arranged like curly locks of hair, thus forming an elastic bed on which to repose during its pupa state. After it has changed from its pupa to its perfect form, it still remains dormant and motionless in its cell, sometimes for several weeks. Awaking at length to life and activity, it crawls upward, loosening and pulling down the dust and chips from the upper end of its burrow, till it reaches the bark. Through this it cuts a remarkably

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smooth round hole, of the exact size requisite to enable it to crawl out from the tree. This hole is commonly only four or six inches above the surface of the ground. And sometimes a worm will be met with boring its cylindrical burrow in the wood of the root, in a situation where it is evident it intends to pass its pupa state under the ground and emerge below or at the surface.

Although this borer is a native insect which has always existed upon this continent, it appears to be recently that it has taken up its residence in the apple tree. Aged persons inform me that no insect except the caterpillar was formerly known to infest this tree; and it is quite certain that our predecessors, fifty and a hundred years ago, with the little attention they were accustomed to bestow upon their orchards, could not have had such thrifty, large, long lived trees as we know were common at that time, if this and other insects attacked them then as they do now. We have met with no record, pointing this out as a depredator, until the year 1824, when Mr. Say, describing this species, notes that "In the larva state it is very injurious to the apple tree, boring into the wood." And the following spring its character appears to have become known in the vicinity of Albany for the first time. The reminiscence is one of too much interest in the history of this insect to be permitted to pass into oblivion. April 27th, 1825, the late Philip Heartt of Troy, in a letter to Jesse Buel, states that an orchard of young trees which he would not have parted with for two thousand dollars, he had just discovered were all girdled and destroyed, or very nearly so, by worms under the bark, of all sizes, from that of a large yellow grub, downward. Some of these insects at that early season were found in their perfect state, from which Dr. James Eights, Jr. ascertained them to be the species which Mr. Say had recently named and described. Judge Buel hereupon wrote to Mr. Say, soliciting further information and a remedy, who replied, recommending a measure which had then lately been found successful against the peach root borer, namely, placing common mortar around the root of the tree. This correspondence is published in full in the Memoirs of the New-York Board of Agriculture, vol. iii, commencing on page 478; and from it some facts may be gathered respecting the habits of

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this insect, which have not been stated in any of the accounts since published.

Remedies.—To repel the beetle from depositing its eggs upon the bark, the tree should be rubbed with soft soap or some other alkaline preparation, the latter part of May. Although the insect has been found changed from its pupa to its perfect form in April, I suppose such individuals would remain dormant in their cells until the season became more advanced and warm; and we have no knowledge of its appearing abroad until the beginning of June. We are yet in want of exact observations as to the date of its depositing its eggs. If preventive measures have been neglected and these worms have established themselves at the root of the tree, they should immediately be ferreted out and destroyed. This can be done much more easily when they are young and small, as they are then lying directly under the bark. Young trees should therefore be inspected every autumn or early in the spring; and if any particles of powder, like new sawdust, are found upon the ground around the root, the dead blackish bark at that point, and at other places where such bark occurs, should be cut away, until the worm beneath is discovered. A little experience will render one expert in detecting the lurking places of these pests. And they should never be allowed to remain until the second summer, to finish their injury by boring in the solid wood of the tree.

3. APPLE BUPRESTIS, *Chrysobothris femorata*, Fabricius. (Coleoptera Buprestidæ.) [Plate I, fig 3.]

A pale yellow footless grub, its anterior end enormously large, round and flattened. Excavating a cavity under the bark and in the solid wood analogous to that of the preceding species, but much smaller.

The insect a flattish oblong, shining black beetle, its under side appearing like burnished copper, its wing covers with three raised lines, the outer two interrupted by two impressed spots. Length 0.50. Basking in the sunshine, upon apple trees, in June and July. See Trans. N. Y. State Agricultural Society, 1854, p. 729.

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APPLE. TRUNK.

4. PRICKLY LEPTOSTYLUS, *Leptostylus aculiferus*, Say. (Coleoptera. Cerambycidæ.) [Plate I, fig. 4.]

Small worms, similar in appearance to young apple tree borers, occurring sometimes in multitudes under the bark, forming long, narrow winding tracks upon the outer surface of the wood, these tracks becoming broader as the worm has increased in size.

A rather short and thick brownish gray beetle, with small prickle-like points upon its wing covers, and back of their middle a white curved or V-shaped band, with a black streak on its hind edge. Length, 0.35. Appearing the last of August. See Country Gentleman, vol. ix, p. 78.

The wood of the apple tree was formerly highly valued for cabinet work in this country. In 1786, a son of Gen. Israel Putnam, residing in Williamstown, Mass., had a table made from one of his apple trees. Many years afterwards the gnawing of an insect was heard in one of the leaves of this table, which noise continued for a year or two, when a large long-horned beetle made its exit therefrom. Subsequently the same noise was heard again, and another insect, and afterwards a third, all of the same kind, issued from this table leaf—the first one coming out twenty and the last one twenty-eight years after the tree was cut down. These facts are more fully stated in the history of the county of Berkshire, published at Pittsfield, 1829, page 39. This, I believe, is the longest period of an insect remaining alive in timber, of which we have any record, and it is important to ascertain, if possible, what insect this was. John J. Putnam, Esq., of Whitecreek, N. Y., was a young man, residing at his father's in Williamstown, when these remarkable incidents occurred. On showing to him specimens of all the larger long-horned beetles of this vicinity, he points to the *Cerasphorus balteatus* (plate 1, fig. 8; see insects infesting the trunk of the hickory,) as being the same insect, according to the best of his recollection, though he is not certain but it might have been the *Callidium agreste*. This testimony, in connection with what President Fitch of Williams college says of the insect in the notice above referred to, "its color dark glistening brown with tints of yellow," releases us from all doubts upon this subject, as the *agreste* is of a uniform brown color, whilst the *balteatus* commonly presents traces more or less distinct of an oblique yellowish spot or band near the middle of its wing covers. We may therefore regard the *balteatus* as another insect which occasionally bores in the trunks of the apple tree.

5. APPLE BARK BEETLE, *Tomicus Mali*, new sp. (Coleoptera. Scolytidæ.)

Young thrifty trees, soon after putting forth their leaves in spring, suddenly withering, as though scorched by fire, the bark becoming loosened from the wood, and soon after numerous per-

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forations like pin holes appearing, penetrating through the bark and into the wood, from each of which comes out a very small, cylindrical beetle, which is smooth, slender, black, sometimes dark chestnut red, its legs and antennæ testaceous or dull pale yellowish, its thorax anteriorly minutely punctured, the declivity at the tip of the wing-covers less abrupt than usual, with an excavation or groove along the suture, which gives the apex a notched appearance, and near the middle of the declivity upon each side of this groove a slightly elevated tubercle of the shape of a crescent, with its concave side towards the suture. Length 0.09.

I only know this insect from specimens recently sent me from Middlefield, Mass., by Lawrence Smith, Esq., who writes me that he took them July 6th, from the trunk of an apple tree ten inches in diameter, which was numerously punctured from the surface of the ground to where the limbs commenced branching off, above which no traces of them were to be found. In another letter he states that this insect was first noticed in his neighborhood two years ago, when several nursery trees were riddled by them. Nothing was seen of them last year; but they have reappeared the spring of the present year (1857) in greater abundance, and a number of trees have been ruined by them. I find a specimen of this same insect also in a collection sent me several years since from Ohio, by Dr. Robert H. Mack, of Parma.

The joints of the feet and the contour of the antennæ is the same in this insect as in the genus *Tomicus;* but between the second joint of the antennæ and the knob or club is a mere cylindrical pedicel to the knob, scarcely as long as the second joint and less than half its diameter, destitute of articulations cutting it up into small joints. The antennæ are thus but five jointed, the knob being composed of only three nearly equal joints. And I find no genus defined, the antennæ of which strictly coincide with those of this species.

PEAR BLIGHT BEETLE, *Scolytus Pyri.* See Pear insects, No. 56.

Several individuals of this species were also found by Mr. Smith, associated with the foregoing, and coming out from the bark a few days before them, making a perforation twice as large, the holes of that species being but three-hundredths of an inch in

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diameter, whilst those of this insect measure 0.06. A specimen of the wood sent me, shows a perforation made by this larger insect, running in a straight line through the bark and into the wood three-fourths of an inch, with three lateral galleries of the same size branching off from this at right angles upon one side, and one upon the opposite side, these galleries being excavated up and down parallel with the grain of the wood.

It thus appears that the pear blight beetle, instead of being limited to the twigs in its operations, as has heretofore been supposed, attacks the trunk of the tree also. And it is therefore evident that there are two generations of this insect each year. The new shoots at the ends of the limbs are not sufficiently grown to accommodate the earliest brood, and they are therefore nurtured in the trunk of the tree. When these reach maturity, the newly grown twigs offer them a more dainty repast, and they accordingly resort to them, blighting and destroying them in the manner hereafter stated in the account of this insect, No. 56.

It was formerly supposed that the bark beetles only infested trees which were already dying or dead. But more recent observations have shown that sound healthy trees are attacked and killed by them. And these observations are fully confirmed by Mr. Smith, who states that it is young thrifty apple trees, that made a most vigorous growth last summer, which have been killed this past spring by these insects.

Worms consuming the wood of old and hollow trees, hastening their decay.

The larvæ of quite a number of beetles feed upon the old and decaying wood of almost all our trees, showing little preference for one tree over another. Those only which from their very large size will be liable to attract notice when found as they frequently are in the interior of aged apple trees, may here be specified, although they are equally common in oaks, willows, &c.

6. HORN-BUG, *Lucanus Capreolus*, Linnæus. (Coleoptera. Lucanidæ.)

Large thick nearly cylindrical white worms, with the hind part of their bodies curved downwards and forwards, their heads and six legs tawny reddish, the mouth darker. In the loose dirt which accumulates in the hollow of the tree, forming large hard

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brown pods, resembling eggs, in which to lie during their pupa state.

The insect, a large oblong beetle, smooth and shining, of a chestnut or mahogany color, the males with stout sickle-shaped jaws as long as the head, and having a small tooth on their inner edge near the middle. Length 1.00 to 1.20. Often flies in at open windows, in warm evenings in July. See Harris's Treatise, p. 40.

7. Rough Osmoderma, *Osmoderma scabra*, Beauvois. (Coleoptera Melolonthidæ.)

A worm similar in size and shape to the preceding, but much more rough and wrinkled transversely, changing to a broad oval black beetle, coarsely punctured, flattened upon its wing covers, which are rough from irregular elevations and have impressed lines along the middle; the males smaller, purplish black and slightly coppery, with the head flat and its edges turned upward. Length 0.80 to 1.10. Appears in July. See Harris, p. 37.

8. Smooth Osmoderma, *Osmoderma eremicola*. Knoch.

This doubtless has the same form and habits with the preceding though it has not yet been observed in its larva state. The beetle is also similar in size and form, but is perfectly smooth, shining and of a deep mahogany brown color, the males having a broad transverse excavation on the fore part of the thorax. See Harris, p. 38.

9. Big-eyed snapping beetle, *Alaus oculatus*, Linnæus. (Coleoptera Elateridæ.)

A smooth flattened tawny yellow worm, dark brown or black at each end, growing to two and a half inches in length by 0.40 in width, rather broadest in the middle, the last segment with two thorn-like points curving upward, and on its under side a large, soft retractile pro-leg, with six small slender legs anteriorly; changing to a long, rather flat black snapping beetle, with its wing covers speckled with white, and on its thorax two large eye-like spots of coal black, surrounded by a white ring. Length 1.00 to 1.80. Occurs in June and July. See Harris, p. 48.

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APPLE. LIMBS.

Two other New-York species, very similar to this and doubtless having the same habits, may here be noticed. They are much less common, and are met with in the month of April.

10. PURBLIND SNAPPING BEETLE, *Alaus myops*, Fab.

Brown, clouded with ash-gray, the eye-like spots much smaller, dim, and oval instead of round.

11. BLINKING SNAPPING BEETLE, *Alaus luscus*, Fab.

Differs from the foregoing only in being wholly destitute of any gray or white coloring.

The DIVARICATED BUPRESTIS (see No. 71,) is sometimes met with upon decaying apple trees.

AFFECTING THE LIMBS AND TWIGS.

Mining the twigs internally causing them to perish.

12. APPLE TWIG BORER, *Bostrichus bicaudatus*, Say. (Coleoptera Bostrichidæ.)

Particular twigs withering and their leaves turning brown in midsummer, with a hole the size of a knitting needle perforated at one of the buds some six or twelve inches below the tip end of the twig, this hole running into the heart of the twig, which is consumed some inches in length.

The insect, a small cylindrical beetle, dark chesnut brown, black beneath, the fore part of its thorax rough from minute elevated points, and in the males furnished with two little horns, and the tips of their wing covers above, with two prickle-like points which curve inwards. Length 0.25 to 0.35.

This insect occurs from Pennsylvania to Mississippi, and has been common of late years in the orchards of Michigan and Illinois, but has never been met with as yet in New-York or New-England.

The BLIGHT BEETLE destroys the twigs similarly, perforating a minute hole at several of the buds instead of one only, but it is more common on the pear tree. See No. 56.

The OAK PRUNER, represented on plate ii., fig 2, in its larva state severs the small limbs, in summer, cutting them off as smoothly as though the work were done by a saw. It is rare on

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the apple and so common on the oak that the description of it will be given under the latter.

Wounding the twigs externally, causing them to break and fall.

13. NEW-YORK WEEVIL, *Ithycerus Novæboracensis*, Forster. (Coleoptera Attelabidæ.)

A beetle in May and June, eating the buds and gnawing into the twig at their base, cutting it often to the pith.

A gray weevil, the largest one in this country, each of its wing covers with four white lines, which are interrupted by black dots, the thorax with three whitish lines. Length 0.35 to 0.60. See Horticulturist, vol. viii, p. 386.

14. SEVENTEEN-YEAR LOCUST, *Cicada septemdecim*, Linn. (Homeoptera. Cicadidæ.)

Appearing in June, in immense numbers, at intervals of seventeen years; making slits in the small limbs of the trees, in which to deposit its eggs, causing a profuse flow of sap from the wounds, the limb commonly perishing. A very large black fly with red eyes and four large glassy wings, the ribs of which are bright orange yellow. Width across the wings when spread, 2.50 to 3.25. See Trans. N. Y. State Agric. Soc. 1854, p. 742.

This locust will next appear in this State in 1860 along the Hudson river and on Long Island; in 1866 in the west end of the State; and again on Long Island in 1868 and 1872. S. Calverly, Esq., of Brooklyn, assures me that some of these locusts can be met with on Long Island every year.

DOG-DAY CICADA, see No. 72.

Puncturing the smooth bark of the limbs and extracting their juices.

15. APPLE BARK-LOUSE, *Aspidiotus conchiformis*, Gmelin. (Homoptera. Coccidæ.)

An oblong flattish brown scale, one-eighth of an inch long, shaped like an oyster shell, fixed to the smooth bark and resembling a little blister; sometimes crowded together in such numbers as to wholly cover the bark. Beneath each of these scales from a dozen to a hundred minute white eggs, which hatch the latter part of May, giving out tiny lice, resembling minute white

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dots or atoms, which disperse themselves over the smooth bark and then become stationary, with their beaks inserted in the bark sucking its juices. Some of these ere many days acquire two wings and resemble small flies or midges. These are the males. The others remain fixed to the bark, die, and become overspread with a substance resembling fine blue mould, forming little patches upon the bark through most of the month of June. As this mouldiness wears off, the little blister-like scale first noticed again becomes visible, these scales being the dried relics of the females, forming a covering to protect their eggs through the autumn and winter. See Trans. N. Y. State Agricultural Soc. 1854, p. 732.

Of late years every orchard in the district adjacent to Lake Michigan has been ruined by this insect. Numerous remedies for abating the evil have been tried, without success. Now at last, it is pretty well ascertained that anointing the trees with grease or oil is an effectual remedy. I am assured of this by Dr. Hoy, of Racine, and other correspondents, and by several communications in the Prairie Farmer and other agricultural periodicals.

16. COTTON SCALE INSECT, *Aspidiotus Gossypii*, new species.

It may not be wholly out of place in this connection to observe that almost every tree and shrub, as well as many herbaceous plants, are infested, each with a species of bark-louse or scale insect peculiar to it. As yet, however, no insect of this kind has been recorded as pertaining to the cotton plant. But on some dried specimens of the *Gossippium religiosum*, sent me from Ningpo, China, by Rev. M. S. Culbertson, of the Presbyterian Board of Missions, I find a scale insect placed along the sides of the mid-vein, upon the under surface of the leaves. It is smaller than the scales of the apple bark-louse, pale yellow, flattened, of a broad oval form, pointed at one end, the opposite or rounded end being whitish, thin, and semi-transparent. It also shows a slender raised line running lengthwise upon each side of the middle, and slight transverse wrinkles. There is reason to apprehend that this insect may find its way to our shores at some future day, and become detrimental to one of the most important staple products of our country.

17. APPLE TREE BLIGHT, *Eriosoma lanigera*, Hausmann, (Homoptera. Aphidæ.)

Small patches of white down or cotton-like wool covering a cluster of minute pale lice; situated near the root, particularly around the base of twigs and suckers growing from the trunk,

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and where any wound in the bark is healing, and in autumn common also in the axils of the leaf stalks towards the ends of the twigs; sometimes so multiplied, in European countries, as to cover the whole under sides of the limbs, and also the trunk, the tree appearing as though it were whitewashed; preferring trees whose fruit is sweetest.

Under each small patch of down is commonly one large female and her young. The female is about 0.06 long, egg-shaped, dull reddish brown, with a black head and feet and dusky legs and antennæ. She is dusted over with a white mealy powder, and has a tuft of white down growing upon the hind part of her back, which is easily detached. See Harris's Treatise, p. 193.

AFFECTING THE LEAVES.

Puncturing them and extracting their juices.

18. APPLE APHIS OR PLANT LOUSE, *Aphis Mali*, Fab. (Homoptera Aphidæ.) [Plate I, fig. 1, the male, fig. 5, the female.]

Small green lice without wings, accompanied by a few black and green ones having wings, crowded together in vast numbers upon the under sides of the leaves and the green succulent tips of the twigs, the leaves becoming distorted hereby and turned backwards, often with their tips pressing against the twig from whence they grow.

The winged individuals with a black thorax and a green abdomen, having a row of black dots along each side, and pale legs with black knees and feet. Length 0.05 to the tip of the abdomen. The wingless individuals slightly larger, with the thorax and abdomen green, the legs pale, with black feet. See Trans. N. Y. State Ag. Society, 1854, p. 753.

19. APPLE-LEAF APHIS, *Aphis Malifoliæ*, Fitch.

Found with the preceding on apple trees in Illinois; distinguished from it by being slightly larger and having the abdomen as well as the thorax black, the second fork of the wing veins at its tip nearer to the end of the fourth vein than it is to the end of the first fork, and other differences in the wing veins. See Trans. N. Y. State Ag. Society, 1854, p. 760.

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APPLE. LIMBS.

20. MOULDY APHIS, *Callipterus mucidus*, new species. (Homoptera Aphidæ.)

A solitary plant-louse, walking on the leaves or hovering on the wing in their shade, having its body, legs and antennæ coated over, more or less, with pruinose matter resembling fine bluish white mould. Palè green, whitish anteriorly, legs and antennæ black, their bases pale; wings clear and glassy with a small dusky or black cloud on the tips of the veins; the rib-vein whitish to the stigma, and from thence thicker and coal black. Length 0.075.

21. THORN-BUSH TREE-HOPPER, *Thelia Cratægi*, Fitch. (Homoptera Membracidæ.) [Plate ii, fig. 5.]

On apple trees and more common on thorn-bushes, in July and August, standing upon the small limbs, and when approached by the finger, leaping away with a sudden strong spring and becoming lost to the view. A tree-hopper, shaped like a beech-nut, 0.34 long, black varied with chestnut brown, with a large white spot on each side, which is prolonged forwards into a band across the front, and with a white band also across the hind part of its back, the anterior end of its back with a protuberance extending upwards perpendicularly.

In the present treatise I retain the genus *Thelia* in its original integrity, as proposed by Amyot and Serville, including in it those species only which have a horn-like protuberance, more long than wide, arising from the fore part of the thorax, and compressed and rounded at its summit. The genus as thus limited, embraces the *bimaculata* and *acuminata* Fab., the *belligera* Say, the *univittata* Harris, and the above species. In my Catalogue of the Homopterous insects in the State Cabinet of Natural History, published in 1851, I proposed the generic name *Telamona* for certain other species which could not be referred to any of the genera in Amyot and Serville's work, differing from Thelia in having a protuberance jutting up from the middle instead of the anterior part of the back, this protuberance being more wide than high when the insect is viewed in profile, and more or less square in its form. M. Fairmaire in his valuable memoir on the *Membracidæ*, in the fourth volume of the second series of the Annals of the Entom. Soc. of France, published a few years previous to my Catalogue, and giving much the most full and clear exposition of this group that has yet appeared, unites these insects to the genus *Thelia*, and also includes the genus *Smilia* of Amyot and Serville in the same genus, employing the name *Smilia* for an allied group of insects in which the apical cell of the fore wings is quadrangular instead of triangular. The *Thelia* of M. Fairmaire thus becomes an extensive genus, embracing insects which present notable differences in their external form. I know not why M. Fairmaire founds a portion

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of the genera in this family upon differences in the shape of the thorax, and disregards analogous differences here, especially since these differences are not in the least sexual here as they are in some of the other genera. I am therefore induced to retain the genus *Smilia* for those insects to which it was applied by Amyot and Serville, being a portion of the first section of this genus as it was originally proposed by Germar, and the equivalent of the first and second sections of M. Fairmaire's genus *Thelia*; his third section being the same with my genus *Telamona*, and his fourth section being the *Thelia* of Amyot and Serville, and of the present Report.

22. BUFFALO TREE-HOPPER, *Ceresa bubalus*, Fab. (Homoptera. Membracidæ.) [Plate ii, fig. 4.]

A tree-hopper of similar form and the same habits with the preceding, appearing on this and most other trees from July till the end of the season. Color light grass-green when alive, freckled with whitish dots; anteriorly with a short sharp point on each side, jutting horizontally outwards, having some resemblance to the horns of a bull or buffalo. Length 0.30 to 0.40.

23. CALF TREE-HOPPER, *Ceresa taurina*, new species.

This is like the preceding in every respect, except that the space between the horns is concave instead of rectilinear. It is the insect named *Membracis taurina* in Dr. Harris's Catalogue, and perhaps is not a distinct species from the foregoing.

Several other kinds of tree-hoppers and leaf-hoppers occur upon apple trees, but being more common on oaks, willows, and other trees, will be noticed hereafter, each in connection with the tree to which it appears to be most attached. Several of these insects puncture the tender bark of the small limbs as well as the leaves.

24. LARGE TREE-BUG, *Arma grandis*, Dallas. (Hemiptera. Pentatomidæ.) [Plate ii, fig. 7.]

A large flat bug, the size and somewhat the shape of a pumpkin seed, but with a conspicuous sharp spine projecting outwards on each side anteriorly. Color dull pale yellowish, with numerous minute brown punctures above and red ones on the under side, and with two burnished brassy green dots near each anterior angle of the thorax. Length of the male 0.60, female 0.75. Appearing on apple, oak and other trees from July till the end of the season.

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APPLE. LIMES.

25. SPANGLED TREE-BUG, *Arma bracteata*, new species.

Like the preceding and of the same size, but darker colored, and having in addition to the brassy green dots of that species one on each anterior angle of the thorax, two on the middle of its anterior edge, and two others back of these last, with several small irregular greenish black spots on the scutel and wing covers. Rare. Met with in July.

26. SPINED TREE-BUG, *Arma spinosa*, Dallas.

Like the foregoing, but smaller and destitute of the brassy green dots; a dusky brown spot on the membranous tips of the wing covers; beneath with a row of black dots along each side of the middle, and a large round spot on the middle of the last segment; thighs with one or two black dots near their tips. Length 0.42 to 0.52. During summer and autumn common on apple trees throughout the United States. Very similar to the Modest tree-bug, No. 101.

Beetles eating the leaves.

ROSE BUG, see No. 50.

27. CLOAKED CHRYSOMELA, *Glyptoscelis crypticus*, Say. (Coleoptera. Chrysomelidæ.)

A thick cylindrical beetle, with its head sunk into the thorax and the thorax narrower than the body; pale ash gray from being entirely covered or cloaked with short incumbent whitish hairs; the closed wing covers showing a small right angled notch at the tip of their suture; scutel dusky. Length 0.32. Mr. Say met with this insect in Missouri, and my specimens are from the same vicinity, gathered by Wm. S. Robertson, who informs me that it eats oak leaves, but seems to prefer those of the apple tree, on which it is found in abundance.

Worms eating the leaves.

Probably a greater variety of worms are able to sustain themselves upon the leaves of the apple than upon those of any other tree. Some of these will be numerous during one or two seasons and will then scarcely be seen again for several years, whilst of others a few will be met with almost every year. Some of them

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APPLE. LEAVES.

take on different colors and marks with every change of their skins, so that a description of the full grown worm will not apply to it when it is small. Quite a number of these worms are yet unknown to us in their perfect state. Of those mentioned below, the eight first are caterpillars, clothed more or less densely with hairs; the four next are large thick bodied worms, and the remainder are small and more slender.

28. APPLE-TREE CATERPILLAR, *Clisiocampa Americana*, Harris. (Lepidoptera. Bombycidæ.)

In May, forming large cobweb-like nests in the forks of the limbs; black, hairy caterpillars with white lines, and along each side a row of blue spots; living together in societies; finally dispersing and spinning oval white cocoons, placed in sheltered corners. The moth appearing the first of July, dull brownish red, its fore wings crossed by two straight white bands running parallel with the hind margin. Width of the wings when spread, 1.20 to 2.00. See Transactions of 1855, p. 413.

FOREST CATERPILLAR, *Clisiocampa sylvatica*. See Oak insects.

FALL WEB WORM, *Hyphantria textor*. See Cherry insects, No. 88.

HICKORY TUSSOCK MOTH, *Lophocampa Caryæ*. See Walnut insects.

29. YELLOW-NECKED APPLE-TREE WORM, *Eumetopona Ministra*, Drury. (Lepidoptera. Notodontidæ.)

Clustered closely together and wholly stripping the leaves from a particular limb, in August; when alarmed holding both ends of their bodies stiffly upward; dull yellow, cylindrical worms thinly clothed with long soft hairs, with light yellow stripes and black heads, when older becoming black with a yellow neck and light yellow stripes. The moth varying from buff yellow to auburn brown, its fore wings crossed by three to five narrow brown or blackish bands, the forward one curved and transverse, the other straight and parallel with the hind margin. Width 2.00 to 2.40. See Transactions, 1855, p. 467.

30. AMERICAN LAPPET MOTH, *Gastropacha Americana*, Harris. (Lepidoptera. Bombycidæ.)

In July, August and September, appressed to and resembling a natural tumor or swelling of the bark; a flattened ash-gray worm

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2.50 long, fringed low down on each side with tufts of blackish and gray hairs, and readily known by its having above on the fore part two bright scarlet velvety bands. The moth tawny reddish brown, the inner angle of its fore wings notched as though eaten off by a worm, and commonly a pale cloud extending from this notch towards the tip, edged often on each of its sides by a zig-zag dark brown line. Width 1.50 or more. Appearing the latter part of May. See Harris's Treatise, p. 293.

31. VELLEDA LAPPET MOTH, *Planosa Velleda*, Stoll. (Lepidoptera. Bombycidæ.)

A worm similar to the foregoing in its habits and appearance, but of a faint pale green color with numerous irregular whitish lines resembling the streaks upon bark, and with a narrow black band above in the suture between the second and the third rings. The moth milk white with a large auburn brown spot on the middle of its back, its fore wings entire, dusky gray, crossed by a wavy white line near the hind edge and two others forward of this near the middle; the males scarcely half as large as the females. Width 1.25 to 2.75. See Harris's Treatise, p. 293.

32. AMERICAN VAPORER MOTH, *Orgyia leucostigma*, Smith and Abbot. (Lepidoptera. Arctiidæ.)

In winter, clusters of white eggs and a dead leaf adhering to a whitish cocoon, attached to the twigs or limbs. In midsummer a slender caterpillar with pale yellow hairs and tufts and black pencils, its head and two small protuberances on the hind part of the back bright coral red. The moth dull smoky or sooty brown, its fore wings with a white dot near the inner angle, a rhombic black spot on the outer edge near the tip, with an oblique black streak forward of it, which is often prolonged to the inner margin and forms the hind edge of a broad ash gray band crossing the middle of the wing. Variable. Width 1.20 to 1.40. Females without wings, ash gray. See Transactions, 1855, p. 441.

33. CECROPIA EMPEROR MOTH, *Attacus Cecropia*, Linn. (Lepidoptera. Bombycidæ.)

In August, consuming the whole leaf and its veins, a large cylindrical pale green worm three or four inches long and as thick as one's thumb, and having two rows of pale blue projecting

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points along each side, and two rows of pale yellow ones upon the back, with four larger bright orange or red ones anteriorly, all ending in little black prickles; attaching its large pod-like rusty gray cocoon to the side of a limb. The moth large, its wings dark gray, each with a large white crescent-like spot in the centre, margined with red, and beyond this a red band crossing both wings and margined on its fore side with white upon the hind pair. Appears in June. Width five to seven inches. See Harris' Treatise, p. 299.

A few words in explanation of the name of this moth may not be amiss in this connection. Sir James Edwin Smith says "we cannot in this instance commend the nomenclature of Linnæus, nor is it easy to conjecture what connection he imagined between this moth, magnificent as it is, and the city of Athens, to which its name implies it to belong." And Dr. Harris, echoing the same sentiment, remarks, "Cecropia was the ancient name of the city of Athens; its application, by Linnæus, to this moth, is inexplicable." The great legislator of this department of human knowledge, as he is expressively styled by Latreille, it has frequently been remarked, was endowed with a genius which few of his disciples have inherited, for selecting names for natural objects, which are most appropriate and happy. The idea which was present in the mind of Linnæus, when he named this splendid moth, we think is sufficiently evident. The Athenians were the most polished and refined people of antiquity. The moths are the most delicate and elegant of insects; they are the Athenians of their race. Cecrops was the founder, the head of the Athenian people. When the names of men were bestowed upon cities, ships or other objects regarded as being of the feminine gender, classical usage changed these names to the feminine form. The moths (Phalæna) being feminine, and the name of Cecrops being more euphonious in this form, probably induced Linnæus to change it in the manner he did. The name thus implies this to be the leader, the head of the most elegant tribe of insects, or in other words, the first of all the insect kind. What name more appropriate can be invented for this most sumptuous moth? It was in the cabinet of Queen Ulrica that Linnæus met with this species, and it appears that after having bestowed upon it this name, another species became

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known to him, vieing with this in its adornment and much surpassing it in size. One insect being already named, indicating it as the first of the whole race, what name could now be found which would suitably express the rank and importance of this new discovery? The great master was at no loss in this dilemma. The larger species was accordingly termed *Atlas*, indicating it to be the foundation upon which the whole insect world rests. How many have since been familiar with these most magnificent and princely moths, wholly unconscious of the tact and skill which Linnæus manifested in selecting the names which they bear!

Some explanation of the generic names which are adopted in this report, for this insect and those related to it, is also necessary. The name *Attacus*, meaning elegant, or connected to the Athenians, was originally given by Linnæus to a section or subgenus of his group BOMBYCIDÆ, having the wings expanded when at rest. Schrank afterwards gave the name *Saturnia* to these same insects. Germar subsequently revived the original Linnæan name, but most authors still continue the name proposed by Schrank. Duncan (Jardine's Naturalists' Library, vol. vii,) has recently proposed dividing these insects into quite a number of genera. Plain, and in the main judicious as his arrangement of them is, he in our view, improperly ignores the name *Attacus*, and unfortunately gives an erroneous location to some of the species. Thus our American *Cecropia* and *Promethea* are the two species which he figures and fully describes as illustrating his genus *Hyalophora*. Yet, as its name implies, this genus is characterised as having large hyaline glass-like spots on the middle of the wings. But no vestige of such spots exists in either of these species. The author has evidently been misled by figures, presuming the white spots represented in the centre of the wings to be hyaline, whereas they are opake. A new situation must therefore be assigned to these two insects. And as the *Cecropia* is the first species of *Attacus* named by Linnæus, after those with glassy spots are removed, it may most appropriately be taken as the type of a genus to retain the original Linnæan name, which genus is particularly distinguished by having near the tips of the fore wings an imperfect eye-like spot, formed by a round black spot margined on its inner side by a bluish white line. In the centre of

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the wings also, at least in one sex, is a white crescent, beyond which a white or pale red band crosses both wings. In addition to our two American species, this genus includes the East Indian *Cynthia* of Drury, the parent of the Arrindy silk-worm, noted for yielding a fabric of such durability that garments made from it outlast a person's life time, and are handed down from parents to children, like other heir-looms in a family. These three insects also present as striking a resemblance to each other in their preparatory as in their perfect states. And these species being thus disposed of, the genus *Saturnia* will remain for those moths like *Pavonia*, which have large opake eye-like spots in the centre of the wings.

34. APPLE SPHINX, *Sphinx Gordius*, Cramer. (Lepidoptera. Sphingidæ.)

The fore part of August, adhering when at rest to the under side of a twig, with the forward half of its body held obliquely outward. A thick, cylindrical apple-green worm, 2.50 long, with a reddish brown horn projecting upward from the hind part of its back, and along each side seven oblique violet stripes margined on their hind side with white. Burying itself deep in the earth and producing a large strong narrow-winged moth the following May or June, its fore wings sooty brown varied with ash gray, with black streaks between the veins and a white dot near the middle, placed upon a long slender black line. Width 2.80 to 3.50. See Silliman's Journal, vol. xxxvi. p. 295.

35. BLIND-EYED SPHINX, *Smerinthus excæcatus*, Smith and Abbot. (Lepidoptera. Sphingidæ.)

Similar in size, habits and appearance to the preceding, but the worm with a rough granular skin of an apple green color, with the horn bluish, the seven streaks along each side narrow, yellowish white, and two short pale lines before. The moth with rose red hind wings, having near their inner angle a black spot with a pale blue centre. Rare. See Silliman's Journal, vol. xxxvi, p. 290.

36. LARGE YELLOW BUTTERFLY, *Papilio Turnus*, Linn. (Lepidoptera. Papilionidæ.)

In August, commonly seen resting day after day upon a small mass of cobweb-like threads upon the upper surface of a particu-

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lar leaf, a pretty, bright leaf-green, thick, smooth worm, tapering, thickest anteriorly, where on each side is an eye-like spot formed of a black spot having a pale blue centre and surrounded by a pale yellow ring which is widened on its upper side and has a short black line in this widened part. Growing to 1.25 in length and 0.40 thick. The pupa naked, attached to the side of a limb and held in its place by a silken thread passed around its body in the form of a loop. The butterfly appearing in June, of a rich pale yellow color, its wings with a broad black border in which is a row of yellow spots, and with four black streaks, the inner one extending across both pairs. Width 3.00 to 4.75. Somewhat common.

37. RED-HUMPED PROMINENT, *Notodonta concinna*, Smith and Abbot. (Lepidoptera. Notodontidæ.)

In August, in a cluster, eating all the leaves from the end of a particular limb, cylindrical prickly worms striped with black and tawny yellow, and on each side with white also, with bright red heads and a slight hump on the fourth ring, and with two rows of black prickles along the back and shorter ones upon the sides. Length 1.25. Forming a cocoon under leaves upon or slightly under the earth. The moth appearing the last of June; light brown, its fore wings dark brown on the inner and grayish on the outer margin, with a dot near the middle, a spot near each angle and several longitudinal streaks along the hind margin dark brown. Width 1.00 to 1.20. See Harris's Treatise, p. 329.

UNICORN PROMINENT, *Notodonta unicornis*, see Plum insects, No. 66.

HAG MOTH, *Limacodes pithecium*, see Cherry insects, No. 85.

38. CANKER WORM, *Anisopteryx vernata*, Peck. (Lepidoptera. Geometridæ.)

The last of May and in June, piercing small holes in the leaves and when larger consuming all the leaf except the large veins. A very variable measure-worm, nearly an inch long, ten-footed, black, clay-yellow or greenish, commonly with an ash-gray back and a pale yellowish stripe along each side. The pupa state passed under ground, the moth hatching late in autumn and on warm days in winter, but mostly early in the spring; the female gray, without wings, crawling up the trunk of the tree to deposit her eggs; the male with large very thin silky ash-gray fore wings,

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with a whitish spot on their outer edge near the tip and crossed by two jagged whitish bands having blackish dots along their edges, and a row of black dots at the base of the fringe. Width 1.25. Very variable, the white bands often wanting. A smaller kind (*Anisopteryx pometaria*, Harris,) without the white spot and bands and with the fore wings crossed by three interrupted dusky lines, is thought by Dr. Harris to be perhaps a distinct species. See Harris's Treatise, p. 359.

39. V-MARKED MEASURE WORM, *Erannis Tiliaria*, Harris. (Lepidoptera. Geometridæ.)

In June, eating large notches in the sides of the leaves; a very variable ten-footed measure worm 1.25 long, brownish black or pale yellow, often with black, white and pale yellow stripes along its back, its head pale with rusty freckles, and commonly a black V-shaped mark upon the front. The pupa under ground, the moth appearing late in autumn; the females wingless; the males nankin yellow, their fore wings large, thin, sprinkled with brown atoms and crossed by two wavy brown lines, the forward one often faint or wanting; a brown dot near the middle of both wings. Width 1.50 to 1.75. See Harris's Treatise, p. 370.

40. APPLE TORTRIX, *Brachytænia Malana*, Fitch. (Lepidoptera. Torticidæ.)

In June and September, eating irregular notches in the margin and holes in the middle of the leaves; a rather thick, cylindrical light green worm an inch long, with five white lines and numerous white dots. The pupa in a cocoon in a curved leaf. The moth appearing in July and again in the cold months, its fore wings ash-gray, whitish toward the outer margin, and crossed by three distant zigzag black lines which are faint or indistinct towards the inner edge. Width 0.80 to 1.15. See Transactions, 1855, p. 473.

41. UNSTABLE DRAB MOTH, *Orthosia instabilis*, Schifferrmyller. (Lepidotera. Noctuidæ.)

A worm which I have supposed was the same with that of the preceding species, but which appears to be rather thicker bodied, as though it had been fuller fed, and grows to a size a fourth larger, and enters the ground to pass its pupa state, was alluded to in my last Report. Moths which I knew had come from these larger

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APPLE. LEAVES.

worms, I obtained last winter. They appeared to be identical with a very common European species, named *Orthosia instabilis*, but as authors speak of that insect as feeding only upon oak leaves, I was in doubt whether I would be justified in pronouncing this which feeds upon the apple to be the same. In April, however, on going by night into a forest chiefly of oak trees, this same moth was discovered quite common there. It was clinging around the wounds made in the sugar maples, drinking the sap which flowed therefrom, and instead of flying away when the light of the lantern approached, it merely dropped itself among the dead leaves for concealment, frequently falling into the vessels of sap and drowning therein. It was evident that these moths had come from worms which had fed on the foliage of the surrounding oaks. All doubts of the insect in question being identical with that of Europe were thus resolved. The larva is described in books as being green, with a white line upon the back and a pale yellow one upon each side. It is when it is young and small that it answers to this description. When larger it commonly presents five white lines and the surface becomes freckled with white dots. I once was not a little vexed with myself on finding my memoranda of one of these worms which I was feeding, to be very incorrect; but subsequent observations showed that it was the worm that had changed. The species may well be called unstable, as not only the larva but the moth also is extremely variable; insomuch that authors have heretofore named and described a half dozen species from what are now regarded as mere varieties of this insect. It is commonly of an ash-gray color, varied more or less with rusty. Near the middle of the fore wings is a faint round spot and behind it a kidney-shaped one, of a blackish-gray color margined by a whitish line, the space between these spots rusty and often extended into a band crossing the wing. Towards their hind edge is a rusty transverse streak on the middle, and in a line with it a spot of the same color upon the outer and another upon the inner margin. Width of the spread wings, 1.50.

42. PALMER WORM, *Chætochilus Pometellus*, Harris. (Lepidoptera. Tineidæ.)

Appearing the latter part of June, at times excessively numerous, residing in worm-eaten leaves drawn together by silken

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threads, and when jarred dropping and hanging in the air suspended by a thread; a pale yellowish green worm, having a dusky or blackish stripe along each side of the back edged on its upper side by a narrower whitish stripe, and with a dusky line on the middle of the back. The pupa remaining in the same mass of leaves occupied by the worm, and giving out the moth in about ten days. The moth ash-gray, with its fore wings sprinkled with black atoms, and having four black dots near their middle and six or seven smaller ones around their hind edge. Width 0.65. See Transactions, 1855, p. 453.

43. TAWNY-STRIPED PALMER WORM, *Chætochilus Malifoliellus*, Fitch.

The fore part of July, residing in a folded worm eaten leaf; a slender pale yellowish worm with a tawny yellow stripe along each side of its back, this stripe having a white stripe upon its lower as well as its upper side, and a pale yellow head. The moth like the preceding, but the fore wings not sprinkled with black atoms, and having, in addition to the dots of the common palmer worm moth, a tawny yellow band toward the tips of the wings, edged with whitish on its fore side. See Transactions, 1855, p. 463.

44. COMRADE PALMER WORM, *Chætochilus contubernalellus*, Fitch.

Appearing in company with the Palmer worm, and closely resembling it, but having the head and neck shining black instead of light yellow. The moth also sprinkled and dotted like that of the Palmer worm, but the ground color of the fore wings dark brown on their inner and white on their outer half. See Trans. 1855, 464.

45. EYE-SPOTTED BUD MOTH, *Spilonota oculana*, Harris. (Lepidoptera. Tortricidæ.)

In May and June, with silken threads fastening the young leaves together as they are starting from the buds, and living within and feeding upon them; a small pale dull brownish worm with shining elevated dots each giving out a fine hair, its head, neck and a spot on the top of the eighth ring dark brown. Changing to a pupa in the same nest, from which the fore part of July comes a small moth of a dark ash-gray color, its fore wings whitish in the middle, mottled with dark gray, the tips light brown with four little black

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marks forming an eye-like spot, and another near the inner angle formed by three minute black spots arranged in a triangle, having often a black dot in its centre. Width 0.50 to 0.60. This is probably identical with the European *ocellana* of Schifferrmyller, afterwards named *luscana* by Fabricius and *comitana* by Hubner, Stephens, and others. See Harris's Treatise, p. 377.

46. Rosacean Tortrix, *Lozotænia Rosaceana*, Harris. . (Lepidoptera. Tortricidæ.)

In May and the fore part of June, with silken threads drawing together the young leaves at the ends of the limbs, secreting itself within them and feeding thereon; a slender pale green or yellowish green worm, sometimes flesh red or brownish, 0.75 long, its head and neck above brownish, often a darker green stripe along its back, and with a few smooth dots, each yielding a short fine hair; changing to a pupa within its nest, from which about the first of July comes a short broad flat moth, resembling a bell in its outline, its color dull nankin or drab yellowish, of a dusky shade from numerous small wavy dark brown lines crossing its fore wings, on which are three slightly darker broad oblique bands, situated upon the base, the middle and the hind part. Width of the spread wings 1.10. See Harris's Treatise, p. 376. Both the worms and the moths vary greatly as they are reared upon rose, apple, peach or cherry and other leaves, and it is very doubtful whether this is different from a common European insect possessing the same habits—the Rose Tortrix (*L. Rosana*, Linn.) the several varieties of which have heretofore been regarded as distinct species.

47. Rosy Hispa, *Uroplata rosea*, Weber. (Coleoptera. Hispidæ.)

In July, large brownish blister-like spots appearing upon the leaves, from a leaf-mining worm in their interior, eating the green parenchyma and leaving the skin entire; the worm 0.20 long, tapering, flattened, soft, yellowish white, its head and neck blackish; changing to a pupa in the leaf, from which in six or seven days comes a small flat coarsely punctured beetle, its wing covers forming an oblong square, tawny yellow, posteriorly red or purple, which color extends forward to the shoulders and onwards upon the sides of the thorax in a stripe which is often black. Length

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0.20 to 0.25. Variable in its colors. This is the *Hispa quadrata* of Fabricius; whether it is the anteriorly described *rosea* of Weber is somewhat doubtful. See Harris's Treatise, p. 106.

AFFECTING THE FRUIT.

48. CODLING MOTH, *Carpocapsa Pomonella*, Linn. (Lepidoptera. Tortricidæ.)

Feeding upon the core and its seeds, causing much of the young fruit to wither and fall, and occurring also in ripened stored apples; a small white worm with a shining black head and neck and with little smooth dots arranged in pairs, each giving out a fine hair; when larger becoming flesh colored with a tawny brown head and neck; in summer completing its growth in three or four weeks, and coming out through a hole gnawed in the side of the apple; surrounding itself with a white web in a crevice of the bark or similar situation and there passing its pupa state; the moth appearing the latter part of June, but straggling individuals occurring the whole year round, dropping their eggs singly upon the flower end of the apple, from which the young worm penetrates inward to its centre. The fore wings of the moth occupied by alternate irregular transverse wavy streaks of ash-gray and brown, and on the inner hind angle a large tawny brown spot, which is bordered by a brilliant golden mark nearly in the form of a horse shoe. Width 0.75. See Kollar's Treatise, p. 229.

49. APPLE MIDGE, *Molobrus Mali*, Fitch. (Diptera. Tipulidæ.)

In the interior of ripened and stored apples, accelerating their decay, whilst the outer surface remains fair; numerous slender tapering glassy-white maggots; changing to pup in the interior of the apple, from whence come a small slender black midge, 0.15 long, its abdomen blackish with a pale yellow band at each of the sutures, and its wings hyaline tinged with smoky. See Transactions, 1855, p. 484.

PLUM WEEVIL. This makes the same crescent-shaped wound upon young apples as on plums, causing them to drop to the ground prematurely. See Plum insects, No. 70

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APPLE. - FRUIT.

50. Rose bug, *Macrodactylus subspinosus*, Fabr. (Coleoptera. Melolonthidæ.)

Clustering, sometimes in multitudes, upon the young apples and devouring them, the latter part of June, and when these do not suffice it, eating the leaves also; infesting likewise roses, grape vines, plums and cherries:—a smallish oblong buff-yellow beetle, with shining yellow legs and very long black feet. Length 0.35 to 0.40. See Transactions, 1855, p. 477.

51. Apple Thrips, *Phlæothrips Mali*, Fitch. (Thysanoptera. Thripididæ.)

Appearing in a roundish cavity ate near the tip end of the young fruit; a minute, very slender blackish-purple insect with narrow silvery-white wings lying upon its back resembling a long Y-shaped mark. Length 0.06. See Transactions, 1854, p. 806.

Wasps and Hornets are frequently in the habit of feeding upon growing apples and other sweet fruits, gnawing small roundish cavities in them, and also in autumn when prepared apples are placed in the sun to dry numbers of the same insects are again attracted to them. The common hornet, *Vespa maculata*, Linn., the yellow jacket, as it is usually designated, *Vespa vulgaris*, Linn., and our common wasp, *Polistes fuscata*, Fab., are the chief species which depredate in this manner. But as these insects are most important on account of the injuries they are liable to inflict upon our persons, the description of them more appropriately belongs to another branch of this subject.

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2. THE PEAR.—*Pyrus communis.*

Most of the insects which infest the apple will be found to attack the pear also, in the same manner, these two trees being so closely related to each other. It will not therefore be necessary to repeat their names. A few insects, however, appear to pertain to the pear exclusively, and some belonging to other trees are found upon the pear that have not yet been noticed upon the apple. These are named below.

AFFECTING THE TRUNK, BARK AND LIMBS.

52. PEAR-TREE BORER, *Trochilium Pyri*, Harris. (Lepidoptera. Trochiliidæ.)

Particles of powder, like sawdust, appearing upon the bark, thrown out by a worm underneath, resembling the Peach-tree borer, but much smaller; feeding mostly upon the inner layers of the bark and there changing to a pupa; the moth coming out in autumn, resembling a wasp, of a purple black color with a broad yellow band on the middle of its abdomen and two narrow ones forward of it, its under side golden yellow and its wings clear and glass-like, their veins, margin and fringe purplish black, and the ends of the forward pair blackish with a coppery yellow gloss. Width 0.55. See Harris's Treatise, p. 256.

PIGEON TREMEX, *Tremex Columba*, a large soft white worm boring deep in the interior of the wood. See Maple insects.

PLUM WEEVIL, *Conotrachelus Nenuphar.* (See No. 70.) In the winter season, small crescent-shaped incisions appearing in the smooth bark of the limbs, with the bark upon the convex side of this wound elevated in a slight blister, in the cavity of which lies several minute maggots, supposed to be the larvæ of the plum weevil in their winter quarters.

I am reluctant to publish any observations which are not fully completed and known to be fully authentic. An affection of the bark of the pear tree, however, has been presented to my notice, which is of too much interest to be omitted in this place, although

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PEAR. TRUNK.

I am not perfectly certain that it is caused by the insect to which I attribute it. The importance of the facts which I have to report, will appear from a few preliminary remarks.

The history of the plum weevil or curculio, so far as at preseut known, is briefly as follows. The beetle makes its appearance in May and June, cuts a crescent-shaped incision in young plums and other fruits, dropping an egg in the wound, the worm from which, boring in the fruit, causes it to fall from the tree, and the worm becoming full grown, buries itself in the ground, where it remains from three to six weeks, and having completed its transformations the beetle again comes abroad in July and August. But what becomes of it from this time until the following spring is not yet ascertained. Although this insect and its destructive habits have been so long known in this country, and every owner of a plum tree has year after year endured the most vexatious disappointments from it, we to this day remain in ignorance of its abode and condition during half the year. Most persons who have written upon it, have supposed that some of the worms were so late in leaving the fruit that they remained in the ground through the winter and from these come the beetles which appear in the spring; and several of the remedies which have been recommended for abating this evil have been based upon this theory. But that a whole generation of these insects should be brought forth abortively each summer, to perish without making any provision for a continuance of their species, and that their perpetuity should every year be left to such a mere accident as a few individuals casually belated in coming to maturity, would be an anomaly wholly unlike anything which we meet with elsewhere in this department of nature's works. And Dr. E. Sanborn of Andover, Mass., in several communications published in the Boston Cultivator and Cambridge Chronicle in 1849 and 1850, gives it as the result of a series of observations which he had made upon the larvæ, that at no season of the year do they remain longer than six weeks in the ground, and that neither they nor the perfect insects lie under the ground during the winter. Dr. Harris hence infers, in the last edition of his Treatise, that those beetles which come out the latter part of summer lurk in some place not yet discovered, during the winter, to come abroad again in the spring and deposit their eggs in the fruit.

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PEAR. TRUNK.

But I now come to present a fact which I think will be more satisfactory to the reader as to the place and circumstances in which this insect passes the winter, than anything which has yet been given to the public. In April, 1856, I received from L. B Langworthy of Rochester, a portion of the limb of a pear tree, four and a half inches long and less than half an inch thick, upon which were about thirty short curved or crescent-shaped incisions in the bark, similar to those made by the curculio upon fruit. They were all cut lengthwise of the bark, about 0.15 in length, and upon their convex side the outer layer of the bark was elevated in a little blister-like spot extending the whole length of the crescent and about half as broad as long. On raising this, so as to expose the cavity beneath, several little worms, commonly six in number, were found therein, torpid and lying in a row side by side with their tails toward the crescent and their mouths in contact with the soft green pulp or parenchyma forming the middle layer of the bark, ready to eat their way onwards as soon as the warmth of spring awakened them again to activity. These worms were rather long and narrow, 0.05 in length, broadest across their middle, tapering to a point at one end, the opposite or head end being rounded. They were without feet, transparent and pale yellowish, resembling little specks of gum or turpentine. They had evidently come from eggs which had been dropped in the curved incision. A few of these incisions had no elevation of the bark along their side, in which instances the weevil had doubtless been disturbed and abandoned her work before it was completed, or the eggs which she deposited in the incision had been discovered and devoured by some predaceous insect.

Although until these worms have been reared we cannot be certain what they are, there is the strongest presumptive evidence that they are the progeny of the plum weevil. Fifty years ago, one of the best authorities in our country upon a topic of this kind, Rev. F. V. Melsheimer of Pennsylvania, stated that the larva of this insect lived under the bark of the peach tree. But from that day to this, no one of the many who have undertaken to investigate this insect, have given any confirmation of this statement. Yet in the light of what is reported above, we cannot but regard it as true. We are informed by Kollar, that the plum

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weevil of Europe (*Rhynchites cupreus*) when there is no fruit for it, resorts to the new shoots in which to place its eggs. All the circumstances, therefore, lead us strongly to the opinion that the conjecture advanced by Dr. Harris in the first edition of his Treatise, but since abandoned by him, is correct, namely, that those beetles which are hatched the latter part of the season, finding no young fruit in which they can deposit their eggs, are obliged to resort to the smooth tender bark of the branches of our different fruit trees, and the worms from these eggs repose in, not under the bark, through the winter, and produce the beetles which appear the following June and oviposite in the young fruit.

If this opinion as to the winter quarters of the curculio proves to be correct, it may lead us to most important results. After allowing for all casualties, it is probable that a hundred beetles might have been matured from the short piece of limb which came under my observation. The worms, however, are only covered by the epidermis and the thin outermost layer of the bark. Soft-soap or some other alkaline substance applied externally, there is little doubt would penetrate through this covering sufficiently to destroy these worms when they are so small and tender. And it appears probable that by a careful inspection of the limbs of those trees whose fruit has been destroyed and other trees standing adjacent to these, the winter retreat of this enemy may be discovered by the marks he places upon the bark, and a remedy may then be applied with greater ease and which will be more effectual for his destruction than anything hitherto suggested.

53. PEAR BARK-LOUSE, *Lecanium Pyri*, Schrank. (Homoptera. Coccidæ.)

A hemispherical shell, the size of a half pea, of a chestnut brown color, adhering to the under side of the limbs. See Transactions, 1854, p. 809.

54. SCURFY BARK-LOUSE, *Aspidiotus furfurus*, new species. (Homoptera. Coccidæ.)

Little round or oval white wax-like blisters on the smooth bark of the pear tree.

I know this only from specimens found upon the same limb of the pear tree from the garden of L. B. Langworthy of Rochester, on which the incisions of the plum weevil above spoken of occurred.

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PEAR. TRUNK.

The bark of this limb was covered with an exceedingly thin gray film, appearing as though it had been coated over with varnish, which had dried and cracked and was peeling off in small irregular flakes, forming a kind of scurf or dandruff upon the bark. In places this pellicle was more thick and firm and elevated into little blister-like spots of a white color and waxy appearance, of a circular or broad oval form, less than the tenth of an inch in diameter, abruptly drawn out into a little point at one end, which point was stained of a pale yellowish color and commonly turned more or less to one side. On breaking open any of these spots with the point of a needle, quite a number of exceedingly minute oval eggs of a glossy bright purple color were found beneath. These eggs probably produce mites of such minute size as to be wholly imperceptible to the naked eye, myriads of which, there is little doubt, at times overrun the bark of particular trees of this kind, exhausting their juices and causing them to pine and droop, when the proprietor is wholly unable to discover the occasion of their unthriftiness. The habits and changes of this insect will be similar to those of the Apple bark-louse, (No. 15) and other kindred species. It is probably this species as it appears in autumn, of which, as this page is passing through the press, I notice some valuable observations by A. O. Moore, in the American Agriculturist, vol. xvi., p. 287.

55. PEAR-TREE PSYLLA, *Psylla Pyri*, Linn. (Homoptera. Psyllidæ.)

The smaller limbs and twigs drooping, their bark rusty blackish, and a multitude of ants and flies gathering around them to feed on the honey dew which is dropped copiously by a small yellow jumping insect resembling a louse, which punctures the bark and sucks its juices, frequently killing the tree. After the middle of summer appearing with transparent wings, and its head deeply notched in front, its color now being orange yellow with the abdomen greenish. Length 0.10. See Harris's Treatise, p. 202.

56. PEAR BLIGHT BEETLE, *Scolytus Pyri*, Peck. (Coleoptera. Scolytidæ.)

Particular twigs of the pear, apple, plum and apricot suddenly withering and dying in the middle of the summer; small perfo-

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rations like pin holes appearing at several of the buds, from which perforations issue a small cylindrical beetle of a deep brown or black color, its antennæ and legs rust-yellow. Length 0.10. This works also in the trunk of the tree, earlier in the season, as already stated, page 327. See Harris's Treatise, p. 78.

AFFECTING THE LEAVES.

CHERRY SLUG-WORM, *Celandria Cerasi*. A shining slimy blackish slug worm, shaped like a tadpole, in June and July consuming the parenchyma of the leaves and leaving their veins entire; some years destroying almost the whole of the foliage. See Cherry insects, No. 92.

57. GOLDSMITH BEETLE, *Areoda lanigera*, Linn. (Coleoptera. Scarabæidæ.)

In May and June, eating the leaves of this and of various forest trees, a large thick oval beetle of a shining lemon-yellow color, its thorax of a greenish golden tinge, and its under side coppery or dark green with white hairs. Length 0.80 to 1.00. See Harris's Treatise, p. 21.

AFFECTING THE FRUIT.

58. PEAR BLISTERING FLY, *Cantharis Pyrivora*, new species. (Coleoptera. Meloidæ.)

Early in June devouring the young fruit, a long cylindrical blistering beetle, of a green-blue color and not shining, its legs orange yellow with the hips, knees, feet and tips of the shanks blue-black and the antennæ black. Length 0.90.

For specimens of this insect I am indebted to my friend Wm. S. Robertson, who informs me they were taken upon a pear tree at Canajoharie about the first of June, 1838. Soon after its flowers had fallen these beetles made their appearance, in numbers, eating the young fruit voraciously and in a short time destroying all or nearly all upon the tree. I have also received this same insect from the southern section of the State. It equals in size our largest American Cantharis hitherto known, the *Nuttallii* of Say (*fulgifer* Le Conte) but is destitute of the brilliancy belonging to

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that species. As the insects of this genus vary in their size it is with considerable hesitation that I enter this as a distinct species, it corresponds so closely in its colors and other characters with the *ænea* Say (*nigricornis* Le Conte). My examples of that species, however, have the exact dimensions assigned to it by Say and Le Conte (0.55), whilst all my examples of this species are more than a third larger. They moreover have the anterior as well as the middle shanks curved.

To test the blistering qualities of this species three of the legs of a specimen nineteen years old were pulverized and mixed with a little cerate and bound upon my arm. In six hours the spot was as nicely vesicated as though the best Cantharides of the shops had been employed.

The worm of the CODLING MOTH (No. 48) and of the PLUM WEEVIL (No. 70) are as prone to infest the interior of pears as of apples.

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3. THE QUINCE.—*Cydonia vulgaris.*

The only insects known to us as occurring upon the quince are the same that are found upon the apple, and also the Cherry slug worm, No. 92. Its worst enemy is the APPLE TREE BORER (No. 2) which appears to prefer the quince to any other tree; and in districts where this insect abounds it is found to be almost impossible to grow this fruit.

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4. THE PEACH.—*Persica vulgaris.*

AFFECTING THE ROOT.

59. PEACH-TREE BORER, *Trochilium exitiosum*, Say. (Lepidoptera. Trochiliidæ.) [Plate I, fig. 6 the male, fig. 7 the female.]

Boring in and eroding the bark and solid wood, causing the gum to exude so copiously as to form a thick mass around the root intermingled with the castings of the worm, which is cylindrical, soft, white, with a tawny yellowish red head and sixteen feet, and grows to more than half an inch in length. It forms a tough pod-like cocoon on the side of the root, jutting slightly above the surface. The moth comes abroad the last half of July and in August, and resembles a wasp in its appearance. It is of a dark steel blue color, and in the male the wings are clear and glassy with a dark blue band extending nearly across the forward pair beyond the middle, whilst in the female only the middle of the hind wings are clear and glassy and her abdomen has a broad bright orange yellow band upon its middle. Width 0.80 to 1.30. See Transactions, 1854, p. 813.

This important insect is so well known throughout our country under the technical name *Ægeria exitiosa* that it is unfortunate this term cannot remain undisturbed. But so long ago as 1777 Scopoli gave the name *Trochilium* to the same insects for which the Fabrician name *Ægeria* was published thirty years afterwards. The latter name, therefore, is merely a synonym of the former, and is wholly rejected by the latest and best authorities.

AFFECTING THE TRUNK AND LIMBS.

APPLE BUPRESTIS, a flattened pale yellow grub under the bark mining in the sap wood. See No. 3.

DIVARICATED BUPRESTIS, a worm similar to the preceding and found in the same situation. See No. 71.

60. ELM BARK-BEETLE, *Tomicus liminaris*, Harris. (Coleoptera. Scolytidæ.)

Small perforations like pin holes appearing in the bark particularly of diseased trees, from which in August and September

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issues a minute cylindrical bark-beetle of a dark brown color, its wing covers with deeply impressed punctured furrows and short hairs and its thorax also punctured. Length 0.10 or less. I have obtained this from elm bark, the same situation in which Dr. Harris found it, and this is doubtless its original residence. But Miss Margaretta H. Morris has met with it under the bark of peach trees which were affected with "the yellows." See Downing's Horticulturist, vol. ii, p. 502.

The PEACH-TREE BORER above described (No. 57) is not confined to the root, but frequently occurs also under the bark of the trunk, particularly in the forks of the limbs, causing the gum to exude from the spot where it nestles.

The OAK PRUNER, or a species possessing the same habits, bores in the heart of the small limbs, the latter part of summer, a few inches or a foot or more in length, and then girdles the limb, severing the wood as smoothly as though it were cut off bv a saw. See insects of Oak limbs.

61. PEACH BARK-LOUSE, *Lecanium Persicæ*, Modeer. (Homoptera. Coccidæ.)

Fixed to the smooth bark, commonly beside a bud on the origin of a twig, a blackish hemispherical shell the size and shape of a half pea, its surface uneven, shining, commonly showing a pale margin and stripe upon the middle; covering a multitude of minute eggs which hatch small lice like mites, which scatter themselves over the bark, puncturing it and sucking its juices, similar to the pear bark-louse No. 51.

AFFECTING THE LEAVES.

62. PEACH TORTRIX, *Crœsia Persicana*, new species. (Lepidop. Tortricidæ.)

Early in May when the young leaves are putting forth from their buds, a worm tieing them together with fine silken threads, secreting itself within and feeding upon them; the worm rather slender, pale green with a whitish streak along each side of its back and a pale dull yellowish head; changing in its nest to a pupa about the middle of June and giving out the winged moth the beginning of July. The moth with the fore wings rusty yel-

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low varied with black, their basal third much paler tawny yellow; a large triangular white spot on the middle of the outer margin; a transverse white streak forward of the middle of the hind edge, which is divided by the veins crossing it into about four spots, and is bordered on its anterior side by a curved black band. Width 0.65.

Having bred this moth from worms gathered upon the peach, I name it accordingly, though it is quite probable that, like other insects of this family, it feeds upon the foliage of several different trees. I have never observed it till the present season, and presume that like many of its kindred, it will be common at times, and will scarcely be seen again for several years. Of the species mentioned in the books it most resembles the *Schreberiana* as figured by Wood and described by Stephens (Haustellata, iv, p. 81.) We learn, however, from Stephen's List of the British Museum, that the specimen from which this figure and description were taken is suspected to be North American, and is not the true *Schreberiana*, but according to Mr. Doubleday (Zoologist, v. p. 1729) is the *trileucana* of Gmelin. There must be some error in this citation, however, as no species bearing this name occurs in Gmelin. Even though the specimen alluded to should be American and already named, the insect before us appears to be a different species, that having, among other discrepancies, a pale streak upon the hind edge of the fore wings, whilst here the corresponding streak is distinctly forward of the hind edge.

ROSACEAN TORTRIX. Another worm tieing peach leaves together in the same manner and at the same time with the preceding, differs from it in being destitute of the whitish stripe or line along each side of the back. It is light green with a line along the middle of the back of a deeper green color, which is often faint or wholly wanting. I have frequently found these worms upon the peach, and some of them which I have reared have produced moths which I can only regard as being a dark colored variety of the exceedingly variable Rosacean Tortrix already described. See No. 46.

The APPLE SHOULDER-STRIPED TORTRIX also feeds upon the leaves of the peach, but makes no nest in which to secrete itself.

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PEACH. LEAVES.

It closely resembles the foregoing, but has three white or pale yellow stripes when young, and five when mature, and is also then freckled with pale dots. See No. 40.

The UNSTABLE DRAB MOTH, occurs also upon the peach, at the same time with the preceding, and most closely resembles it as already stated. See No. 41.

62. PEACH APHIS, *Aphis Persicæ?* Sulzer. (Homoptera. Aphidæ.)

This begins to appear upon the first small leaves which protrude from the buds and continues through the season unless swept away, as it frequently is, with surprising suddenness, by its several insect enemies. (See Transactions, 1854, pp. 767–806, where a full account of our American destroyers of the Aphides will be found.) It punctures the leaves to suck their juices and is a common though probably not the only cause of "the curl." It lives together in crowds, hid in the crevices of the curled, corrugated leaves, most of the individuals being larvæ and wingless females. The winged individuals are 0.12 long, black with the under side of the abdomen dull green, the shanks and bases of the thighs pale brownish, and the horns or horny tubes as long as to the tip of the abdomen. This would appear to be different from the European peach aphis as figured in Koch's invaluable monograph and described by Fonscolombe and others, though the wing veins coincide with Walker's description. I however have not yet given this insect a careful examination, and have noticed individuals so unlike those above described that they seemed to be another species.

The BUFFALO TREE-HOPPER, a light green jumping insect shaped like a beech nut, puncturing and sucking the juices. See No. 22.

The SADDLED LEAF-HOPPER, a smallish oblong black jumping insect with a large bright yellow spot like a saddle upon the middle of its back. See No. 69.

AFFECTING THE FRUIT.

The PLUM WEEVIL (No. 70) bores in the young fruit, causing it to drop from the tree. The ROSE BUG (No. 50) sometimes invades this fruit also, nibbling and killing it.

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5. THE NECTARINE.—*Persica lævis.*

The PLUM WEEVIL (No. 70) and other insects which depredate upon the peach are liable to attack this tree in the same manner.

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6. THE APRICOT.—*Armeniaca vulgaris.*

The PEAR BLIGHT BEETLE (No. 56) sometimes kills particular twigs of the apricot in summer. The PLUM WEEVIL (No. 70) bores in the fruit, and several of the other insects which attack the plum may at times be met with upon this tree.

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7. THE PLUM.—*Prunus domestica, et al.*

AFFECTING THE ROOT.

The PEACH TREE BORER (No. 59) occurs in the root of the plum also, boring under the bark and destroying young trees, but without causing any gum to exude as it does in the peach. See Transactions, 1854, p. 816.

AFFECTING THE TRUNK AND LIMBS.

The PEAR BLIGHT BEETLE (No. 56) occasionally causes the death of a single twig upon one part and another of this tree in summer.

64. UNARMED TREE-HOPPER, *Smilia inermis*, Fab. (Homoptera. Membracidæ.)

In August and September, making straight short incisions, about 0.10 long, in the bark of the small limbs, particularly where the new growth of the year commences, and dropping a little cluster of minute eggs therein, which remain till the sap begins to circulate the following spring, when they hatch insects resembling small mites, which immediately wander away from the spot and subsist upon the juices of the leaves and green succulent twigs, which they puncture with their minute sharp beaks. These insects will be found fully grown in July and are then about 0.28 long

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and of a triangular shape, resembling that of a beech nut, and of a uniform pale green color without any spots or stripes. Like other tree hoppers (which name I apply to insects of the family *Membracidæ*) and leaf hoppers (*Tettigoniidæ*) these insects when approached by the finger give a sudden strong leap and become lost to the view.

I am indebted to George Clark, Esq., of East Springfield, Otsego county, for the above information respecting the work of an insect, which, from his description of it, will be the species which I have named; but specimens which were sent to Dr. Harris a few years since, were said to be the *Ceresa bubalus* (See No. 22) in a letter from him, published at that time in the Journal N. Y. State Ag. Society. Mr. C. informs me the insect he alludes to has no projecting points resembling horns, anteriorly, and is of a uniform pale or pea green color, destitute of any spots or marks, whereas the *bubalus* when alive is deeper green, freckled with whitish dots, and has a pale yellow streak from the horn backwards along each side. The *bubalus*, however, is closely related to this insect and is common upon the fruit and other trees in our yards, and both these species it is probable cut the bark of the plum and other trees in the manner stated above, and we presume the plum weevil also makes a curved incision in the limbs of the plum similar to those we have noticed in the pear.

Mr. Clark has for several years given particular attention to the slits which this tree hopper makes in the bark of the plum and is confident these wounds are the foundation of that most fatal malady the "Black knot." The examinations of this disease which I have made have convinced me that the different insects which writers in our agricultural periodicals have pointed out as producing these excrescences are species which are wholly innocent of the crime laid to their charge. I have watched the growth of the excrescences from their first commencement to their full development, without being able to detect the least indication of an insect in some of them, and in other instances where insects have been present it was plain they were there as a consequence and not as a cause of the disease. The fact, however, that tree hoppers and the plum weevil make incisions in the bark at the same place where this disease shows itself, calls for future investigations, to

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ascertain whether it is not these incisions which lay the foundation for this disease, as Mr. Clark states. Where the incisions are made by tree hoppers the insects will all escape before the swelling in the limb commences, but the slits in the bark will remain, to prove that these insects have been there. Where the plum weevil makes the incisions its larvæ will be present in the excrescence; and this will account for the fact long ago published by Prof. Peck, that he had bred the plum weevil from these excrescences, and hence inferred it was this insect which caused this disease.

AFFECTING THE LEAVES.

The MAY BEETLE a large thick-bodied chestnut or black beetle about the middle of May eats the leaves of this and the cherry tree.. See No. 75.

The ROSE-BUG, a smaller buff yellow beetle also feeds upon them the last of June. See No. 50.

The GRAPE-VINE FLEA-BEETLE, No. 128, sometimes eats numerous small holes in plum leaves also. A young plum tree in my yard had its leaves nearly all destroyed by this insect, every summer, for many years in succession, and other trees near this were more or less injured. Dusting the leaves with caustic and bitter powders proved to be of little if any benefit. At last I resolved to give this unfortunate tree a respite from its enemies, for one season at least, and accordingly picked off and crushed in my fingers every insect that could be found upon it. They were less active after sunset, and with a sudden dart one or two could be caught between the thumb and finger upon almost every leaf. From fifty to two hundred were thus killed daily, for a week or longer, and the hunt was persevered in as long as any insects could be found. This treatment was even more successful than I anticipated, for I have never seen a flea beetle upon my plum trees since that season.

65. PLUM SPHINX, *Sphinx drupiferarum*, Smith and Abbott. (Lepidoptera. Sphingidæ.)

A large cylindrical apple-green worm with a curved violet-blue horn on the hind end of its back, and along each side seven

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oblique white streaks margined with violet upon their upper sides, the head with a white stripe on each side. The pupa under ground, giving out the moth the following June, which hovers about flowers at dusk, resembling a humming bird in its motions; its fore wings measuring from 3.20 to 4.50 when spread; half their surface occupied by a broad dark brown band extending from their inner margin to the tip, in which are about five slender oblique coal-black streaks; the space forward of this band pale reddish gray or ashy clouded with hoary white, and having near the middle a blackish crescent crossed by a long very slender black line; its abdomen gray with a black stripe along the middle, and the sides black with a row of white spots.

The CECROPIA EMPEROR MOTH, No. 33, a large pea green worm with two rows of small yellow prickles on the back and blue ones on the sides, is occasionally met with on the plum.

66. UNICORN PROMINENT, *Notodonta unicornis*, Smith and Abbot. (Lepidoptera. Notodontid.

In August and September, a worm eating a notch in the side of the leaf, often of the exact length of its body, and placing itself in this notch, with the humps of its back resembling the teeth along the edge of the leaf, eventually consuming all the leaf but a small portion of its base; the worm brown like a faded leaf, with its second and third rings leaf green, its head large, and on top of the fourth ring a long horn-like protuberance; growing to 1.25 in length; forming a cocoon on the ground under fallen leaves; the moth appearing in July; its fore wings light brown with patches of greenish white and many dark brown lines, the hind margin white and near the inner angle a small white and two black dashes. Width 1.25 to 1.50. See Harris's Treatise, p. 327.

67. WAVED TUSSOCK MOTH, *Trichetra opercularis*, Smith and Abbot. Lepidoptera. Arctiidæ.)

A caterpillar with brownish evenly shorn hairs rising to a ridge along the middle of the back and sloped off on each side like the roof of a house; making a tough oval cocoon in September, which is fastened to the side of a twig, its top opening by a flat

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circular lid, the moth coming from it the following July. This moth is most readily distinguished by the fine prostrate curled hairs covering its fore wings and arranged in regular waves running as it were from the base to the tip. Its body and legs are also very hairy and at the tip of the abdomen is a tuft of long soft hairs forming a bushy tail. It is of a straw yellow color with the fore wings more or less dusky on the outer margin, and the feet and orbits of the eyes black. The fore legs are often black on their anterior side and sometimes the face is also black. Width 1.20 to 1.80. I have never met with this in New-York and it is omitted in the second edition of Dr. Harris's Treatise, but it appears to be common at the south and west. The *Sparshalli* of Mr. Curtis can scarcely be distinct from this somewhat variable species, and I suspect Mr. Stephens (List Brit. Mus.) is in error in giving that as an Australian insect and that Boisduval was correct in regarding it as North American. Mr. Westwood's generic name *Trichetra* was published the year before Dr. Harris's name *Lagoa*.

AMERICAN VAPORER MOTH. A slender pale yellow caterpillar, its head and two little knobs on its back bright coral red. See No. 32.

The APPLE TREE CATERPILLAR No. 28, and the FALL WEB WORM No. 88, frequently place their cobweb-like nests on plum trees.

The CANKER WORM. A measure worm eating holes in the leaves in June. A gray soft hairy wingless insect crawling up the body of the tree early in spring. See No. 38.

SLUG WORMS. Slimy blackish worms in June and July, eating the green parenchyma and leaving the veins entire. See No. 92.

68. PLUM-LEAF APHIS, *Aphis Prunifoliæ*, Fitch. (Homoptera. Aphidæ.)

Puncturing the leaves and sucking their juices, causing them to become wrinkled and distorted; a black shining plant-louse with a pale green abdomen. Length 0.14. See Transactions, 1854, p. 826.

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PLUM. FRUIT.

69. SADDLED LEAF-HOPPER, *Bythoscopus clitellarius*, Say. (Homoptera. Tettigoniidæ.)

A small cylindrical slightly tapering leaf-hopper, 0.20 long, black or dark brown, with a bright sulphur-yellow spot like a saddle upon the middle of its back, a band forward of this and also the head and under side pale yellow, the forehead with two black dots. This probably punctures and sucks the juices of the green succulent twigs as well as the leaves, but I have particularly noticed it standing upon the fruit stems with its beak inserted therein, extracting the fluids which should go to swell and perfect the fruit. And it would thus seem that these leaf-hoppers, like many other insects, are actuated by a spirit of pure malevolence in making their attack upon that part of the plant where they will do us the most injury, when they might nourish themselves equally as well in places where their harm would be slight.

AFFECTING THE FRUIT.

70. PLUM WEEVIL, OR CURCULIO, *Conotrachelus Nenuphar*, Herbst. (Coleoptera. Curculionidæ.)

Making a small crescent-shaped incision upon the side of the young fruit and dropping an egg therein, from which comes a small white footless worm or grub which bores in the fruit, causing it to become diseased and gummy and to drop from the tree, the worm when full grown entering the ground and in three or four weeks coming out in its perfect state, when it is a short thick rough beetle, shaped somewhat like a pear, and with a long snout like an elephant's trunk hanging down in front, its color dark brown with a broad white or yellow band on the hind part of the wing covers, and small spots of black, white and yellow. Length 0.15 to 0.28. For the winter residence of this weevil, see insects of pear limbs, p. 349. See Harris's Treatise, p. 66.

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8. THE CHERRY.—*Cerasus vulgaris, et al.*

Though some of the insects noticed below have only been observed upon our wild cherries, *Cerasus serotina* and *Virginiana*, there is little doubt but the same will at times invade the garden cherry; and all the trees of this genus are so closely related to each other that, for a purpose like the present, it appears unnecessary to divide them into different heads.

AFFECTING THE TRUNK AND LIMBS.

71. DIVARICATED BUPRESTIS, *Dicerca divaricata*, Say. (Coleoptera. Buprestidæ.)

A flattened worm resembling a tadpole and otherwise similar to the Apple Buprestis, No. 3; mining in the sap wood under the bark; the perfect insect appearing the last of June and through July, running up and down the trunk of the tree in the sunshine; a thickly punctured snapping beetle, having a coppery lustre, its wing covers striated and freckled with small blackish spots, their ends narrowed, drawn out and spreading slightly apart, the tips blunt and as though broken off. Length 0.70 to 0.90. The beech is undoubtedly the original residence of this insect, and wherever a dead tree of this kind occurs some of these beetles will almost always be found upon it on sunny days in midsummer. I know not why, in the lately published Catalogue of F. E. Melsheimer, Kirby's generic name *Stenuris* is preferred to that of Eschscholtz, whilst on a following page precedence is given to one of the generic names of the latter author over one proposed by Mr. Kirby. As Eschscholtz's names for these genera were published several years anterior to those of Kirby I have retained them. For some further items respecting this insect see Harris's Treatise, p. 42.

The ROUGH OSMODERMA No. 7, and the HORN-BUG No. 6, occur in their larva state in old decaying cherry trees, and in their dead stumps one or both of these grubs will be found in profusion and of all sizes.

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CHERRY. TRUNK.

72. SPOTTED HORN-BUG, *Dynastes Tityus*, Linn. (Coleoptera. Scarabæidæ.)

In old decaying trees, a very large grub, like those of the last named species, producing a beetle two inches in length, of a shining pale olive color, its wing covers with round black spots or dots, the males having the middle of the thorax prolonged forwards in a long black horn which is hairy along its under side and commonly notched at its tip, as if to receive the sharp point of another similar horn which curves upwards from the crown of the head; two other horns between these, short and sharp pointed, one upon each side. This large beetle is frequently met with at the south and I have specimens of it from Pennsylvania, but know not of its ever being found in New-York. Mr. Say mentions possessing a specimen having the wing covers chestnut brown and without spots, and I have a female in which the whole of the thorax is black. But probably the most remarkable specimen which has ever been discovered was captured west of Arkansas by Rev. R. M. Loughridge and presented to the entomological cabinet of the N. Y. State Agric. Society. This is a male having the left wing cover black and without spots, whilst the right wing cover and thorax is pale olive yellow.

73. DOG-DAY CICADA, *Cicada tibicen*, Linn. (Homoptera. Cicadidæ.)

In August and September, wounding the small limbs to deposit its eggs therein, a large black fly with four clear glassy wings having a green rib, its head and thorax with olive green spots and marks, and its under side coated with a white meal-like powder. Length 1.60 to 2.00. The *pruinosa*, Say, is this same species, with the white mealy powder not rubbed off as it frequently is in old specimens. The *canicularis*, Harris, are merely small sized individuals of the *pruinosa*. The valves at the base of the abdomen in the males vary in their length both in large and small individuals, and therefore furnish no valid mark, as Dr. Harris supposed, whereby his species can be distinguished. The specimens found in the State of New-York are of the smaller size, this being the northern limit of the geographical range of this species. It extends from hence south to Brazil. In Surinam, according to Madam Merian, it is most common in the coffee plantations, the trees of which are sometimes killed by the wounds which the

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CHERRY. LIMBS.

female makes in the limbs to deposit her eggs. With us it appears to resort to the maple more than any other tree, and in forests and frequently in the trees around our dwellings the loud shrill note of the male is heard every clear sunshiny day throughout dog-days. See Harris's Treatise, p. 190.

74. CHERRY BARK-LOUSE, *Lecanium Cerasifex*, new species. (Homoptera. Coccidæ.)

In June, adhering to the bark upon the under side of the limbs of the wild black cherry, a hemispherical shell nearly the size and shape of a half pea, of a black color more or less mottled with pale dull yellow dots, covering a mass of minute eggs the lice from which spread over the bark and subsist upon its juices. I find no bark-louse indicated by authors as occurring upon the cherry in Europe. We in this country have two insects of this family infesting trees of this kind, the one now mentioned and the following.

75. CHERRY SCALE INSECT, *Aspidiotus Cerasi*, new species. (Homoptera. Coccidæ.)

In winter, on the bark of the choke cherry, little roundish white wax-like blisters, scarcely perceptible to the naked eye, containing beneath them in an open cavity a cluster of minute dull red or resin-like eggs. The history and habits of this species will be analogous to that of the Apple bark-louse, No. 15.

AFFECTING THE LEAVES.

76. MAY BEETLE, *Lachnosterna fusca*, Frohlich. (Coleoptera. Melolonthidæ.)

About the middle of May gathering by night upon the trees and eating the leaves, sometimes in such numbers as to wholly strip the foliage from the choicer varieties; a thick-bodied chestnut-brown or black beetle nearly an inch long, its legs of a lighter tawny yellow color and its breast coated with pale yellowish hairs.

The larva of this insect lives under ground and is most injurious to meadows and pastures. It has been very destructive the present year in some parts of our State, and enquiries have been addressed to me for information respecting it and the best remedies

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CHERRY. LEAVES

for it. An article in reply to these enquiries is published in the Genesee Farmer for August of the present year (vol. xviii, p. 249), the substance of which may here be repeated with some additions, as this is one of our most pernicious insects, and the measures for subduing it which I have to suggest are regarded as important.

This insect is commonly called the May bug, though the name May beetle will be a more definite and correct designation for it. The custom of calling almost all insects "bugs," is often denounced as being an Americanism; but this, like many others of these reputed Americanisms we obtained from our father-land. Thus the cockchaffer, the European analogue of this insect, we see is termed the May *bug* in the English translation of Kollar's Treatise—a clear evidence that we have obtained the name which we give to our insect from England. And in several other instances, the name *bug* will be met with in British publications, applied to beetles. Still, every person intelligent upon this subject is aware it will be an improvement in our language to give the name *beetle* to all hard, crustaceous-coated insects, which belong to the order COLEOPTERA, and restrict the name *bug* to the order HEMIPTERA, or those flat-backed insects which emit the same disgusting scent as the well-known bed-bug.

This insect is also frequently termed "horn-bug," being confounded with a larger, perfectly smooth and more flattened beetle, (No. 6, *Lucanus Capreolus*, Linn.,) which comes out later in the season. It is thus called more particularly, when, like the true horn-bug, it flies in at the open windows of our dwellings upon warm evenings, which both of them frequently do, to the great annoyance and even terror of the female portion of the household. Neither of these insects, however, can harm our persons; and when they intrude into my room in this manner, I find the quickest way to dispose of the pests, is with my fingers to hold their heads in the candle a moment or two, and then toss them out the window.

The name "field grub" has also been given to the larva of this insect in some neighborhoods where its destructiveness has brought it into notice and it was not known that it subsequently turned into a beetle.

As this is one of our most important noxious insects and will be frequently mentioned in the agricultural publications of this

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country, it is a matter of no small moment that its scientific name be correctly ascertained and well settled. Some confusion at present exists upon this point, among different writers. This discrepancy has chiefly arisen from a most disingenuous statement made by Dr. Harris, in both editions of his Treatise, page 28 and 26, where he says the genus *Phyllophaga* was "proposed by me in 1826. Dejean subsequently called this genus *Ancylonycha*." Now the number of the Massachusetts Agricultural Repository in which Dr. Harris's essay appears (vol x, pages 1—12) bears the date of July 1827! and the name *Phyllophaga* is there merely suggested for this insect and its kindred, without any statement of the marks by which the group thus designated can be recognized. In this same year (1827) also, a distinguished British entomologist, Rev. F. W. Hope, published the first part of his Coleopterist's Manual, in which this same group is distinctly set apart and clearly characterized, and the name *Lachno-sterna* (i. e. hairy-breasted) is given it. This name, therefore, is evidently the one which the established rules of scientific nomenclature will give to the genus to which our insect belongs. Dejean's name *Ancylonycha* mentioned above by Dr. Harris, not having been proposed until several years later.

This insect has hitherto been generally entered under the specific name *quercina*, but Dr. LeConte has recently ascertained that nearly ten years before Weber bestowed this name upon it, Frohlich, a German naturalist, had in the year 1792 described it under the name *fusca*.

We thus reach the conclusion that *Lachnosterna fusca*, a term meaning blackish hairy breast, is the correct technical name of our common May beetle, which has so often hitherto been called *Phyllophaga quercina* in our agricultural periodicals.

The May beetle is a glossy thick-bodied insect, 0.80 to 0.90 long and about half as broad. It varies in color from chestnut-brown to black, and this difference of color does not appear to be owing to age, for it is found in newly hatched beetles before they have come forth from the ground. The head is commonly darker colored than the thorax, is closely punctured, and its anterior edge is thin and turned upward, with a concavity but not an angular notch in its middle. The feelers and antennæ are somewhat paler yellow than the legs, which are polished tawny yellow. The punctures upon the thorax are coarse and farther apart than on the head. The wing covers though glossy and

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shining are rough from being covered with shallow indented points the edges of which are wrinkled, and running lengthwise upon each wing cover is three or four raised straight lines. The breast is covered with glossy fine yellowish gray hairs.

This species presents several varieties. Commonly the thorax is a little narrower than the wing covers, whereby the general shape approaches to that of an egg with its small end forward. But sometimes the thorax is broader equaling the width of the wing covers and giving the individual a form nearly cylindrical. The sides of the thorax are regularly rounded, but sometimes a specimen may be found having the lateral margin slightly angular in the middle. Sometimes the punctures upon the thorax or those upon the wing covers are larger and more distinct than usual. By different authors several distinct species have heretofore been made out of these varieties of this insect.

In its larva state it is a thick soft white grub with a brownish head and with the hind part of its body curved downwards and more or less forward under its breast. It is several years in attaining its growth, so that grubs of different sizes will be found in the ground at the same time. When full grown it is almost as thick as the little finger. These grubs feed upon the roots of grass and other plants, which they cut off a short distance beneath the surface; and when they are numerous they advance under ground like an army, severing the turf as smoothly as though it were cut with a spade, so that it can be raised up in large sheets and folded over or rolled together like a carpet. Often from a dozen to twenty grubs will be exposed in every square foot when the turf is thus raised. Large patches of this kind will occur in the middle of a meadow or pasture, every blade of the grass being brown and dead.

Early in spring, in spading or plowing the ground, these beetles are frequently exhumed, or sometimes in turning over a large stone one of them will be found beneath, lying in a smooth cavity or little round hollow in the dirt, like a chicken in its shell. This cavity or cell is formed by the grub in the preceding autumn. Turning itself around and around, it presses upon and compacts the dirt and moulds it into this cell for its winter residence; and in this cell it changes first to a pupa, in which the legs and wing-cases of the insect are seen in their rudimentary state, and afterwards to a beetle, such as we have above described. This beetle lies dormant in its cell until the warmth of the incoming summer

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penetrates the ground sufficiently to awaken it into activity. It then breaks from its prison and works its way out of the ground.

These beetles begin to make their appearance each year about the first of May, and become most numerous in the middle of that month. They are sluggish, inactive, and seemingly stupid in their movements. They repose during the day time, hid in the grass, or any other covert which they find. At dusk they awake and fly about slowly, and with a humming noise, hitting among the leaves of the trees and clinging thereto, and feeding upon them. They are most fond of the leaves of the cherry and plum, which trees they every year injure more or less, and occasionally they congregate in such numbers as to wholly strip them of their foliage, destroying all hopes of any fruit from them that season. An instance of this kind was communicated to me four years since by Milo Ingalsbe, Esq., of South Hartford, at that time President of the Agricultural Society of this (Washington) county. He had seventy plum trees and a number of cherry trees of the choicest varieties, which never gave fairer promise of an abundant yield of fruit than at that time. But a swarm of these May beetles suddenly gathered upon the trees, many of them being then splendidly in bloom, and in two nights, the 15th and 16th of May, wholly stripped them of their foliage, so that many of them were as naked as in winter. With their humming notes, these beetles were flying about the trees every evening until about ten o'clock, when they would settle in clusters of eight, ten, twenty or more, and would thus remain until daylight, when they would tumble down from the trees, flying but little, however, and hiding themselves wherever convenient to stay through the day. These observations are important, showing that between midnight and daylight is the best time for spreading sheets beneath the trees to shake and beat these insects into them. In a subsequent letter, dated June 29th, Mr. I. stated that these beetles had then disappeared from all his trees except an Ox-heart cherry, on which about a dozen were found, this being the choicest variety among his cherry trees—indicating that though seemingly such stupid creatures, they are good connoiseurs in selecting their food. And among his plums, it was the Washington, Jefferson, Lawrence and others of his best kinds which had been attacked with the greatest avidity.

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Apple trees, which were standing alternately with his plum trees, were not in the least molested. Mr. I. has recently informed me that his trees have never been reinvaded by these beetles since that time.

These insects are numerous all over our country. In my own neighborhood they have been common every year, I think, since I first became acquainted with them, more than twenty-five years ago; yet I have here never known the trees to be stripped of their foliage by them, or the turf to be severed by their larvæ, although two or three instances of the latter have been related to me as having occurred in this town, and I have several times heard of the same phenomenon in other places. It appears to be a most singular and remarkable circumstance in the economy of these insects, that, while it is their ordinary habit to live dispersed and apart from each other, they at times become gregarious, both in their larva and their perfect state, multitudes of them assembling together in a flock, and by their conjoined labors utterly devasta ting what they attack. Some other insects, however, show this same habit. It is only occasionally that the migratory locust of the east, so renowned in story, congregates together in swarms and flies off to a distance. And instances have occurred in which the common red-legged grasshopper, which is scattered about the fields of our own country, has done the same in years when it has been unusually abundant.

The history of our May beetle and its transformations have never been fully observed, but everything known respecting it concurs to show that it is exactly analogous to the cockchaffer or May bug of Europe, (*Polyphylla Melolontha*, Linn.,) and occupies the place of that species upon this continent. The grubs of that insect are about five years in obtaining their growth. The beetles pair soon after they come from the ground, and the male lives but a few days. The female crawls back into the ground and there drops her eggs, which are nearly a hundred in number, after which she again emerges, and being now decrepit with age, she feeds but little and dies in a short time.

Among the natural destroyers of our May beetle is the skunk, whose food appears to consist of these insects almost entirely, during the short period of their existence. Some cats will also

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eat them, though I suppose it to be more for sport than food that grimalkin is frequently seen at twilight, stealthily creeping through the grass of the door-yard, and springing upon these beetles as they crawl therefrom to take wing. Our domestic fowls are also very fond of the grubs. But of all the destroyers of these insects, no other animal can vie with the crow, which frequently follows the track of the plow to feed upon the grubs of the May beetle which are turned up thereby.

With regard to remedies we may observe, that in Europe the experience of centuries has failed to discover any efficient measure for destroying a similar insect during the larva period of its existence. And concealed in the ground as these grubs are, it is not probable that any substance can be applied to the soil of sufficient power to kill them without destroying also whatever vegetation is there growing. But where these grubs are so numerous as to sever the roots of the grass and pare the turf, I think there is a measure which may readily be resorted to whereby they may be exterminated. I would recommend the placing of a temporary fence around that part of the meadow or pasture which is so thronged with these grubs, and enclosing a number of swine therein, thus for a while converting the patch into a hog pasture. The propensity of these animals for rooting and tearing up the turf, we are all aware, is for the very purpose of coming at and feeding upon the grubs and worms which are lurking therein; and who knows but this rooting propensity, which has all along been complained of as being the most troublesome and vicious habit which belongs to swine, may after all turn out to be the most valuable and necessary to us of any of the habits with which they are endowed? At all events, it is one of man's greatest achievements to so observe and study the habits and instincts of the lower animals, as to devise ways whereby those habits and instincts, instead of being exerted to his injury, are brought into his service and made to work for his benefit. Therefore do not let us "lords of creation" allow these vile field grubs to rob us of two or three acres of grass without obliging them to give back to us an equivalent for it. Let us have the value of that grass returned to us in the increased size and thriftiness of our swine. I cannot but think these animals, confined upon a spot so overstocked with

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grubs, would in a short time ferret out and devour every one of them, leaving the soil cleansed, mellowed, manured, and well prepared for being immediately laid down to grass again, or for receiving any rotation of crops for which the proprietor may deem the spot best adapted. It should be observed that when cold weather approaches, these worms sink themselves deep into the ground so as to be beyond the reach of frost during the winter, and return back to near the surface again when spring returns; so that when they are severing the roots of grass there will probably be none deeper than hogs are accustomed to root. It will be interesting to know how long a given number of swine will be occupied in cleansing an acre of ground containing from twelve to twenty of these grubs in every square foot. And I earnestly hope those who have lands which are devastated in the manner spoken of, will try the experiment which I have now proposed, and will make the result known to the public, whether it be successful or otherwise.

When these grubs have completed their growth, and come abroad in their perfect state, another opportunity is presented for destroying them and preventing their future increase. Every year when the middle of May is approaching, cherry and plum trees should be inspected each evening, particularly our choicest varieties of these trees, to ascertain if the May-beetles are collecting in numbers upon them; and if they are, they should immediately be shaken off upon sheets spread beneath the trees, and emptied into bags or covered pails, and should be killed by immersing them in boiling water, or pouring this upon them; after which they may be fed to the swine and poultry. Many years ago a writer in the New-York Evening Post stated that trees could in this manner be entirely freed from these beetles in a very few evenings. Trees from which two pailsful were collected the first evening furnished a much less number upon each succeeding night, until the fifth, when only two beetles could be found upon them.

The Rose-bug, No. 50, a buff yellow beetle smaller than the preceding, eats the leaves, the last of June.

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CHERRY. LEAVES.

77. VIOLACEOUS FLEA-BEETLE, *Crepidodera violacea*, Melsheimer. (Coleoptera. Chrysomelidæ.)

From the middle of May till August or later, eating numerous small holes in the tender new leaves at the ends of the limbs, a brilliant coppery, violet or greenish black flea-beetle, 0.10 long, its under side black, its attennæ and legs dull pale yellow with the hind thighs black. It sometimes merely gnaws a little round hollow in the under side of the leaf, leaving the thin transparent skin on the upper side of the leaf entire.

LARGE YELLOW BUTTERFLY. The larva occurs on the cherry the same as on the apple. See No. 36.

78. GLAUCOUS BUTTERFLY, *Papilio glaucus*, Linn. (Lepidoptera. Papilionidæ.)

I have not met with this butterfly in the State of New-York, but a larva identical with that of this species as figured by Abbot, I have repeatedly noticed upon the garden cherry and also on the oak and ash, in August, resting day after day upon a thin cobweb spun over the upper side of a particular leaf. The larva is like that of the large yellow butterfly, No. 36, with several blue or violet dots superadded, namely, one above each of the eye-like spots, four in a transverse row forward of the yellow band, a similar row on each of the three rings forward of the last, and a row lengthwise low down upon each side. The butterfly is black, 4.75 to 5.50 across its wings, and may be recognized by a row of small oval spots of a pale yellow or white color extending across the fore wings near their hind edge.

79. PURBLIND SPHINX, *Smerinthus myops*, Smith and Abbot. (Lepidoptera. Sphingidæ.)

In August, a large cylindrical apple-green worm with a curved horn at the end of its back, two rows of rust red spots, and along each side six oblique yellowish streaks; passing the winter under ground, and in July changing to a moth which may be distinguished by its hind wings, which are dark snuff brown, their inner half light ochre yellow inclosing a large round black spot having a pale blue centre. Width 2.50. Rare. See Silliman's Journal, vol. xxxvi, p. 291.

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CHERRY. LEAVES.

The CECROPIA EMPEROR MOTH, No. 33. Two young worms which I placed on a garden cherry fed freely thereon, remaining till they were full grown, and I doubt not this species sometimes occurs naturally upon this tree.

80. PROMETHEA EMPEROR MOTH, *Attacus Promethea*, Drury. (Lepidoptera. Bombycidæ.)

In August, a large cylindrical, or when at rest a tapering pale greenish-yellow worm coated with a white bloom except at each end, with six rows of black dots or small prickles, the two upper ones on the second or third rings larger, resembling little horns of a bright red color like sealing wax, and on top of the ring forward of the last a single bright sulphur yellow protuberance; forming its cocoon inside of a rolled leaf the stem of which is tied to the limb with silken threads; the moth coming from it the last of June, its wings measuring from 3.60 to 4.40, sooty black, in the female brownish red, bordered behind with drab gray in which is a wavy black line having forward of it on the hind wings a row of round black spots, in the female deep red, the inner ones more or less united.

As Dr. Harris (Treatise, page 300) mentions the cocoons of this insect as sometimes occurring on the cherry it will be inferred that it feeds upon the leaves of this tree. And I introduce this species here, to observe that I have reason to think the statements which have hitherto been made respecting the vegetation on which this insect subsists, are perhaps erroneous, writers having probably taken it for granted that it fed upon the trees on which they have found its cocoons. This is a subject of more than ordinary importance, since it has been shown upon a preceding page that this moth and the Cecropia are most intimately related to the Arrindy silk worm; and further experiments should be instituted to ascertain whether the silk of these moths of our own country does not possess similar durability and strength with that of the East India worm, and whether these insects are not susceptible of being turned to a valuable account.

All the statements hitherto published point to the sassafras as the tree on which the larvæ of the Promethea moth chiefly subsist. Now for fifteen years past a sassafras has been growing in

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my yard without one of these worms ever appearing upon it; whilst upon an ash tree standing beside this sassafras and not three feet distant from it there has repeatedly been a family of these worms. Certainly if the sassafras were the favorite food of this species some of these worms would have been placed upon it. They have also occurred upon ash trees in other parts of my grounds, and upon no other tree have I ever met with them. Last year on the 18th of July a dozen young worms were found in a cluster upon the under side of a leaf of the ash tree above alluded to, and upon an adjacent leaf of the same stalk were the shells of the eggs from which these worms had come, resembling little cups or hemispheres of clear glass. The eggs were in contact with each other on the under surface of the leaf, and this leaf had been partly consumed by the worms when they first came from their shells. I continued to notice them daily for about a week, when they all disappeared, probably mounting high into the tree, and I could discover no traces of them afterwards. Upon the fall of the leaves in autumn I was disappointed to find *no* cocoons upon this tree; but upon a lilac growing against the side of the house four rods distant two dozen cocoons occurred. The worms which formed these cocoons could not have fed upon the lilac without being discovered, and I could not avoid the conclusion that they had been reared upon the ash tree, and when fully grown had migrated to this bush, though in doing so they passed several other lilac bushes, and selected this, perhaps, because growing against the side of the house it would be less apt to be visited by birds than those standing in the open yard. But this precaution did not save them. The last winter being unusually long and severe, our winter birds were obliged to forage more assiduously than usual, and before spring every one of these cocoons were perforated and its inmate destroyed. In other instances I have noticed these worms remaining till they were mature, upon small sprouts of the ash where they could be observed daily. From all these facts I am confident the ash is their favorite food. But when ready to spin their cocoons it is too laborious a task for them with their silken threads to tie the long leaf stalks of this tree to the limbs from which they grow, and I have very seldom known a cocoon to be placed upon this tree.

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CHERRY. LEAVES.

Having finished feeding, the worms invariably repair to other trees having tough leathery leaves which will form a thick substantial mantle around the cocoon, and having short stems that can readily be tied to the twigs from which they grow. We cannot but admire the intelligence which they manifest in this procedure. Authors mention the sassafras, cherry, poplar, Azalea, Cephalanthus, snow-drop (*Halesia*) and bay, as the trees and shrubs on which the cocoons occur; but in this district it selects the lilac in preference to any of these. Few winters pass but that some of these cocoons may be seen on the lilacs in all our yards, and sometimes fifty or more will be observed upon a single bush. In the city of Albany they are equally as common upon the lilacs as in the surrounding country. But as the other insects of this family feed upon several different trees and shrubs, it is not probable that this is confined to one kind of food. Being found, however, in Eastern New-York, so uniformly if not exclusively upon the ash, and its cocoons upon the lilac, it is remarkable that neither of these trees has ever been mentioned by writers, in connection with this most interesting and beautiful moth.

81. IO EMPEROR MOTH, *Saturnia Io*, Fab. (Lepidoptera. Bombycidæ.)

In August, a thick apple green worm, 2.50 long, covered with clusters of prickles having black tips and stinging like nettles if touched, and along each side an orange or brick red stripe freckled with white dots and edged on its lower side by a white stripe; forming a cocoon on the ground under dead leaves; the moth appearing in June, its hind wings bright yellow, their inner margin purplish red and on their middle a large black eye-like spot having a pale blue centre in which is a white streak; the fore wings yellow in the male, purplish brown in the female. Width 2.70 to 3.50. I have met with this on the wild black cherry and on the thorn. From six to nine worms often occur upon the same tree. They commonly eat all the leaves from the end of particular limbs, leaving only a short stump of the leaf stalk. See Harris's Treatise, p. 304.

82. MISIPPUS BUTTERFLY, *Limenitus Misippus*, Fab. (Lepidoptera, Nymphalidæ.)

In June and July, a thick bodied worm 1.75 long, olive green varied with white, the second ring humped and with two long

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CHERRY. LEAVES.

blackish prickly horns, a row of small white prickly warts along each side of the back, and the head white and covered with small prickles; its pupa hanging with its head downwards, on the under side of a limb or leaf, in a week or ten days giving out a butterfly having bright tawny orange wings with black veins and margins and a narrow black band across the middle of the hind pair, the black border having a single row of white dots. Width 2.75 to 3.40. Abbot says the larva feeds on different species of cherry, but it is much oftener met with on willows, and I have also found it on poplar.

83. CLYTON BUTTERFLY, *Apatura Clyton*, Boisduval. (Lepidoptera. Nymphalidæ.)

A worm nearly 1.05 long and as thick as a goose quill, thickest in the middle, pale green with four light greenish yellow stripes, the top of its head having two yellow spines with branching prickles; its pupa hanging from the under side of a limb with its head downwards; the butterfly with blackish brown wings, tawny orange on the basal half of the fore pair, beyond which is two rows of small olive yellow spots and near the hind edge a narrow yellowish band broken towards its inner end. Width 2.20. I have never met with this in the State of New-York. It occurs through the southern States on the cherry and other trees of the same family.

84. AMERICAN LAPPET-MOTH, *Gastropacha Americana*, Harris. (Lepidoptera. Bombycidæ.)

The latter part of summer, a cylindrical worm when feeding by night, but by day broad and flat, pressed to the limb and resembling a tumor of the bark, 2.50 long, ash-gray varied with whitish spots and having two transverse velvety red streaks anteriorly; its pupa in a cocoon also resembling a slight swelling upon the limb, of the same colors with the bark; the moth appearing in May, its wings deeply notched along their hind and inner margins, reddish brown, both pairs crossed by a broad whitish band which has a wavy dark reddish line upon each side. Width 1.50 to 1.90. See Harris's Treatise, p. 293. [NOTE.—This is the same with No. 30. The repetition was not discovered till it was in type, too far to cancel the error,]

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85. HAG MOTH, *Limacodes pithecium*, Smith and Abbot. (Lepidoptera. Arctiidæ.)

In August and Septemoer, a flattened dark brown singular looking worm of an oblong and nearly square form, the sides of its body prolonged outwards into eleven tooth-like processes, the three middle ones of which are longer with their ends curved backward, growing to nearly an inch in length, its pupa state passed in a small cocoon fastened to a limb; the moth dusky brown, its fore wings varied with pale yellowish brown, and crossed by a narrow wavy curved band of this color, edged on its hind side near the outer margin with dark brown, and having near the centre a light brown spot. Width 0.95 to 1.25. See Harris's Treatise, p. 324.

86. DRY LEAF MEASURE-WORM, *Geometra? siccifolia*, new species. (Lepidoptera. Geometridæ.)

A measure worm in many respects like the preceding, but more narrow and flattened and having a marked resemblance to a dry withered leaf or the brown scraggy fragment of a dead twig, may frequently be met with some years, in August and September, most commonly upon choke cherry bushes. It is 0.80 long and a dull dark umber brown color, sometimes of a paler yellowish shade, and with a blackish streak along the middle of its back. The three middle segments are nearly double the width of the others, their sides being prolonged obliquely forwards and upwards in thin flat triangular projections having their tips blunt or slightly notched, and commonly ending in two little sharp teeth. The next segment back of these is also slightly prolonged outwards. On the top of the segment next to the last are two little horns projecting upward. Adhering to a twig with its four hind feet, it remains motionless with its body slightly bent and turned upward, and if knocked to the ground it lies perfectly still. No one from its appearance, would suspect it to be anything possessed of life. The latter part of September it draws two or three leaves together tieing them with silken threads, and spins its cocoon within them; but I have not yet succeeded in obtaining the moth from these cocoons.

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CHERRY. LEAVES.

The ROSACEAN TORTRIX, No. 46, is a common worm upon the cherry

87. CHERRY-EATING TORTRIX, *Lozotænia Cerasivorana*, new species. (Lepidoptera. Tortricidæ.) Plate ii, fig. 3.

In July, tieing the leaves together with silken threads; when numerous, living in societies and forming a large nest, drawing all the twigs and leaves of a particular limb together; oftenest seen on the choke cherry, but occurring also on the garden cherry; an ochre yellow worm with the head, neck, hind end and feet black, and a few fine hairs from smooth shining dots; forming its pupa in the same nest; the moth broad and flat when at rest, the outer edge of its fore wings being strongly rounded towards the base and straight from the middle to the tip, these wings with irregular wavy bands alternately of bright ochre yellow and pale leaden blue, the yellow bands often varied with rusty or blackish atoms forming darker spots, the most conspicuous one of which is placed on the outer margin near the tip, and from this spot a broader ochre yellow band extends towards the hind margin forward of its middle and curves thence to the inner angle; hind wings and all beneath pale ochre yellow. Width 0.75 to 1.10. Like others of this group this moth varies greatly, the marks on its fore wings being confused and indistinct or wholly obliterated in old rubbed individuals. It may always be known, however, from the other moths related to it, by its bright yellow color, in connection with its size and the shape of its fore wings. None of the described insects of this genus appear to have hind wings of so pure yellow without any smoky or dusky shade.

88. FALL WEB WORM, *Hyphantria textor*, Harris. (Lepidoptera. Arctiidæ.)

In August and the fore-part of September, forming a large thin cobweb-like nest on the end of a limb and eating all the leaves in and around it; smallish caterpillars living together in a society, their color pale yellow, with a broad black or blackish stripe upon the back and another beneath, thinly clothed with whitish hairs growing from smooth orange yellow and black dots, the head and feet black; the worms of the same nest varying greatly

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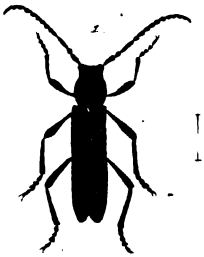
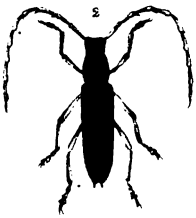
PLATE. 2.



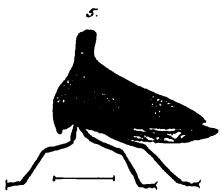
Currant borer



Oak pruner

Cherry Tortrix.

Buffalo tree hopper.



Thorn-bush tree hopper.

Spotted Pelidnota

Large tree bug

A. Tolley. Sc.

Lith. of C. Van Benthuysen, Albany, N.Y.

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in size and colors; growing to about an inch in length and then dispersing and spinning their cocoons in crevices of the bark and similar sheltered situations; the moth appearing the fore part of the following summer, a milk white miller without any spots or dots on its wings, its fore thighs tawny yellow in front and the anterior feet alternated with black and white on their fore side. Width 1.25 to 1.35. This is quite common some years, and occurs upon the ash, willow, and several other trees. See Harris's Treatise, p. 276.

A Brazilian moth very similar to that of our Fall web worm, has been sent me from Bahia, by my friend A. de Lacerda. In this the basal part of the outer edge of the fore wings and the feet are blackish, and the four anterior shanks are orange yellow on their outer side with a blackish spot on their base and another on their middle. Its expanded wings measure 1.50. Its pupa is white with the abdomen flesh colored and is beautifully variegated with symmetrical black stripes and spots, from which circumstance, as I meet with no description of this species, I have named it in my collection, *Hyphantria picti-pupa* or the Painted puppet.

89. YELLOW-NECKED ERMINE MOTH, *Hyphantria collaris*, new species.

A moth closely related to the preceding and doubtless possessing the same habits, has been sent me from Mississippi, and probably occurs throughout the southern states. It is milk white and glossy, its head, neck, base of the outer edge of the fore wings and the anterior hips are pale ochre yellow, and its feet pale brown. Width 1.35.

90. DOTTED ERMINE MOTH, *Hyphantria punctata*, new species.

A worm similar to that of the Fall web worm and possessing the same habits, producing in June a milk white miller having a continuous black stripe on the fore side of its anterior feet and shanks, their thighs and hips being yellow in front, and the fore wings having a black central dot, and in the males a row of small blackish spots extending from the middle of the inner margin to the tip. Width 1.65 to 2.00. This is frequently met with in our district, though much less common than the Fall web worm.

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CHERRY. LEAVES.

91. SPOTTED ERMINE MOTH, *Hyphantria cunea*, Drury.

Caterpillars similar to those of the Fall web worm, and like it forming a large cobweb-like nest on the ends of the limbs of the wild cherry, willow and other trees in autumn. The moth a milk white miller with its anterior feet black on their fore side and alternated with black and white on their hind side. Its anterior shanks are black in front and the thighs and hips orange yellow. In the male the fore wings have numerous small black spots and dots which do not appear in the other sex. Width 1.30 to 1.60. The males vary greatly in the number of their spots, and frequently there is a curved black band upon the middle of their fore wings cut across only by the white veins. This species, named in allusion to its fore wings *punctatissima* or many dotted, by Smith and Abbot, and *cunea* or wedge spotted, by Drury, was described by the latter from specimens captured in the vicinity of New-York city, and S. Calverley, Esq., of Brooklyn, to whom I am indebted for a suite of specimens showing its several varieties, informs me it is quite a common insect there. But I have no knowledge of its occurrence anywhere north or west of the Highlands.

The APPLE TREE CATERPILLAR, No. 28,
VAPORER MOTH, No. 32,
CANKER WORM, No. 38,
APPLE TORTRIX, No. 40, and
PALMER WORM, No. 42, may all be found feeding upon the leaves of the cherry.

92. CHERRY SLUG WORM, *Selandria Cerasi*, Peck. (Hymenoptera. Tenthredinidæ.)

In June and July eating the upper surface of the leaves and leaving the veins and skin of the under side entire; small shining slimy slug worms of an olive brown and blackish color, dull yellow beneath, tapering and swelled anteriorly, resembling young tadpoles; several often feeding upon one leaf; maturing in four weeks and then burying themselves under ground through the winter; changing finally to a small glossy black fly with four

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transparent wings tinged with smoky which forms a dusky cloud across the middle of the fore pair, its four anterior legs and the knees of the hind pair dirty yellow or clay colored, their thighs blackish. Length 0.22. See Harris's Treatise, p. 419.

93. CHERRY ABIA, *Abia Cerasi*, new species. (Hymenoptera. Tenthredinidæ.)

I only know this and the following species from specimens bred from cocoons found attached to the limbs of the wild black cherry, which is a sufficient evidence that their larvæ subsist upon the leaves of this tree. Like other larvæ of the same genera, they will be twenty-footed worms, having two pairs of pro-legs more than the usual number, and they eat the edges of the leaves. The cocoons of both these insects are cylindrical with rounded ends, and are of a tough firm texture, resembling coarse brown paper. Those of the cherry Abia are 0.80 long by 0.38 in diameter. Two of these cocoons were met with last March, upon a low bush within three feet of the ground. One of them had been perforated by birds and its inmate destroyed; the other on being brought into a warm room hatched within a fortnight, indicating that with the first warm days of spring these flies come abroad. They cut off one end of the cocoon smoothly, to make their exit from it, the severed end resembling a little lid, some of the loose threads upon the outer surface of the cocoon forming a hinge whereby this lid can be opened and shut. The fly is black with the abdomen and thighs blue black and the feet and tips of the shanks pale yellow. Its thorax is thinly covered with pale grayish yellow hairs, and its wings are transparent, smoky yellowish, with black veins, those on the basal third pale yellow. Length 0.60, to the tip of the wings 0.80; width 1.35.

The species of this genus are very few, and little is known of their habits. This is the first one, I believe, which has been found in this country. It resembles a *Cimbex*, the antennæ being short, with a round knob at their ends shaped like an egg with its large end outwards, and in the specimen before me there are four joints to this knob, and four in the stem which precedes it, this being one joint more than the normal number in this genus.

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94. BLACK-CALFED SAW-FLY, *Nematus euratus*, new species. (Hymenoptera. Tenthredinidæ.)

This comes from a cocoon 0.30 in lengtn by 0.14 in diameter. The fly eats off the end of its cocoon to make its exit therefrom. It was met with at the same time with the preceding species, and was a week later in hatching. The fly is black with four transparent slightly smoky wings, its mouth lurid white as is also a cloud-like spot on the shoulders, the edges of the abdominal segments, and the legs, the four anterior thighs being black upon their under sides and the hind pair wholly black except at their bases. Length 0.25, to the tip of the wings 0.30.

A surprising degree of intelligence was manifested by this insect, in the situation which it selected for its cocoon. Upon a small limb growing perpendicularly upward the moth of an apple tree caterpillar had placed its belt of eggs, coated over with gum in the usual manner, and immediately above this a small tender leaf was growing. The worm spun its cocoon between this belt of eggs and the leaf above it. The frosts of autumn subsequently wilted this leaf and the rains saturating it weighed it downward, causing it to adhere like a wet cloth to the belt of eggs, the gum upon which afterwards drying glued the leaf securely in this position. And thus the stem of the leaf came to form a band or loop over the cocoon, holding it securely in its place. It is truly wonderful how the worm which formed this little thimble-like cocoon could have known that this spot was so well adapted for its wants. Had it previously crawled over these caterpillar's eggs when they were wet, and thus discovered that their gummy covering then became soft and adhesive? And had it the intelligence to foresee that the leaf growing immediately above them would in a short time wither and lop downwards and become firmly glued to the surface of this gum? It would so appear, from the fact of its placing its cocoon crosswise of the twig, so that it might become bound to it in this manner, instead of attaching it lengthwise as insects generally place their cocoons, and from the further fact that it imbedded the lower end of the leaf stalk in the outer surface of its cocoon, evidently for the purpose of holding the leaf steadily in such a position that when it wilted it must lop

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CHERRY. LEAVES.

directly downward and not sway off to one side. This curious specimen may be seen in the Entomological department of the Museum of the State Agricultural Society.

AFFECTING THE FRUIT.

The PLUM WEEVIL or CURCULIO, No. 70, a small white worm occasionally found in the interior of cherries, is the only insect known to us as infesting this fruit.

9. THE GRAPE.—*Vitis vinifera, et al.*

AFFECTING THE ROOT.

95. GRAPE VINE BORER, *Trochilium Polistiformis*, Harris. (Lepidoptera Trochilidæ.)

A worm resembling the Peach tree borer, No. 59, in its size and habits, producing a moth resembling a wasp, of a dark brown color marked with orange or tawny yellow, and with a bright yellow band on the base of the second ring of its abdomen, its fore wings dusky, hind ones glassy hyaline with the margins and veins black. Width 1.00 to 1.50. Found by Dr. Kron, in North Carolina, where it is exceedingly destructive to both wild and cultivated grapes. See Patent Office Report, 1854, p. 80.

AFFECTING THE STALK.

96. VINE SCALE INSECT, *Lecanium Vitis*, Linn. (Homoptera. Coccidæ.)

Appearing on the bark in June, a brown hemispherical scale from under one end of which a white cotton-like substance protrudes, more and more, till about the first of July, it becomes four times as large as the scale, and from among it minute oval yellowish-white lice, the hundredth of an inch in length, creep out and distribute themselves over the bark, to which they fix themselves and become stationary, sucking its juices. This appears from the short descriptions given by authors, and from

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specimens sent me by Dr. Signoret of Paris, to be the same with the European scale insect of the vine. See Kollar's Treatise, p. 155.

97. FOUR-SPOTTED SPITTLE INSECT, *Aphrophora 4-notata*, Say. (Homoptera. Cercopidæ.)

A spot of white froth resembling spittle, appearing upon the bark in June, containing under it a pale wingless insect which punctures the bark and sucks its juices, as does also the perfect or winged insect which occurs upon the vines the beginning of July, and is a flattened tree-hopper of a brown color, its wing covers having a blackish spot at the tip, another on the middle of the outer margin and a third at the base, with the spaces between these spots hyaline white. Length 0.30.

98. SIGNORET'S SPITTLE INSECT, *Aphrophora Signoretii*, new species.

In habits and appearance like the preceding, but without any black spots or marks, its ground color being tawny brown with dull whitish clouds, and thickly punctured with black, the wing covers having a small white spot on their inner margin near the tip and a larger one opposite this on the outer margin. Length 0.32.

This species has a whitish stripe between two blackish streaks along the middle of the head, but no distinct raised line either here or upon the front. Still, that it pertains to this genus, rather than to *Ptyelus*, is shown by its ocelli or eyelets, which are placed nearer to each other than to the eyes, and by the base of its head, which is angularly notched in the middle instead of being rounded in a regular curve, as we find it to be in both *Ptyelus* and *Lepyronia*. I regard these as the most valid characters by which to discriminate these closely related genera. Another spittle insect which I discovered common upon the pitch pines on the sand plains of Saratoga, and described in my Catalogue of Homopterous insects in the State Cabinet of Natural History, under the name of *Lepyronia Saratogensis*, was the same year described by Mr. Walker, (List of the British Museum, p. 714,) under the name *Ptyelus gelidus*, his description having issued from the press a few months subsequent to mine. Mr. Walker has, accordingly, in the supplement to his list, (page 1153), done me the justice of giving precedence to my name. I think, however, that both this species and the *parallela* of Say must be carried back to the genus *Aphrophora*, since the nearness of their ocelli removes them from *Ptyelus*, whilst the length and narrowness of their wing covers separates them from *Lepyronia*,

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GRAPE STALKS.

and the angular notch in the base of their heads, and the pale stripe, slightly elevated, along the middle of the head and thorax, further separates them from the genera to which they have been referred, and approximates them to *Aphrophora*. The foreign species belonging to these genera, with which I have been most liberally supplied by Dr. Signoret, of Paris, enable me to trace the affinities of these rather anomalous insects much more accurately than it would be possible to do without such aid.

The *Cercopis quadrangularis* Say so closely resembles the European *Lepyronia coleoptrata*, that I am surprised to see it placed in any other genus.

The *Cercopis obtusa*, Say, also placed under *Ptyelus* by Mr. Walker, belongs to the genus *Clastoptera*.

The *Cercopis ignipecta* of Harris's catalogue, also supposed to be a *Ptyelus* by Mr. Walker, pertains to the genus *Monecphora*. As this name, *ignipecta*, was published more than twenty years ago and no description of this species has ever been given, I may here supply this deficiency. In size and form this insect has a marked resemblance to the *Monecphora bicincta*, Say, but is destitute of bands or spots on its upper surface. It is black, old specimens fading to brown, and on the under side the breast, the edges of the abdominal segments, the anterior knees and the hind legs are bright blood red with the tips of the feet black. Length 0.35.

AFFECTING THE LEAVES.

1. *Puncturing them and sucking their juices.*

99. LARGE GREEN TREE BUG, *Rhaphigaster Pennsylvanicus*, Degeer. (Hemiptera. Pentatomidæ.)

A large flattened grass green bug edged all round with a light yellow line, interrupted at each joint of the abdomen by a small black spot, its antennæ black beyond the middle of their third joint, with a pale yellow band on the first half of the two last joints. Length 0.60 to 0.70. This occurs, chiefly in September, throughout the Northern States, upon hickory, willow and other trees, as well as on grape vines. Mr. Dallas has recently described it as a new species, naming it *R. Sarpinus*, List of British Museum, p. 276, and Mr. Say has also named it *hilaris*.

100. BOUND TREE BUG, *Pentatoma ligata*, Say. (Hemiptera. Pentatomidæ).

A large grass green bug closely resembling the foregoing, but more widely edged all round, except upon its head, with pale red,

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GRAPE. LEAVES.

and with a pale red spot upon the middle of its back, occupying the apex of the scutel, its antennæ green, the second joint dusky at its tip and the three last joints black. Length 0.55, width 0.34. Rare. Though so much like the preceding species this pertains to a different genus, being destitute of the sharp point at the base of its abdomen between the hind pair of legs which may be seen in that insect.

101. MODEST TREE BUG, *Arma modesta*, Dallas. (Hemiptera. Pentatomidæ.)

Tawny yellowish gray thickly dotted with brown punctures, the wing covers commonly red at the apex of their leathery portion, and with a brown spot at the tip of their glassy hyaline ends, the under side whitish with a row of distant black dots along the middle of the abdomen and another on each side. Length 0.40 to 0.46. This is one of our most common tree bugs and will be met with in autumn upon a number of different trees and shrubs. It has the spine-like point on the base of the under side of the abdomen very short, and the angular projection on each side of the thorax is not drawn out into a sharp point, by which characters it is readily distinguished from another species very similar to it, the spined tree bug, No. 26.

102. SINGLE STRIPED TREE HOPPER, *Thelia univittata*, Harris. (Homoptera. Membracidæ.)

A tree hopper shaped like a beech nut, with a perpendicular protuberance on the fore part of its back, more high than wide, its summit compressed and rounded, the insect of a chestnut brown color, tawny white in front and with a white stripe along the back, extending from the protuberance to the tip. Length 0.37, height 0.24. Often seen on grape vines in July and August.

The BUFFALO TREE HOPPER, No. 22, may also be noticed on grape vines every day during the latter part of summer.

103. BLACK BACKED TREE HOPPER, *Acutalis dorsalis*, Fitch. (Homoptera. Membracidæ.)

A small triangular shining tree hopper with a smooth rounded back, greenish white with a large black spot on its back, from the anterior corners of which spot a line runs off towards each eye,

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the upper margin of the head and the breast being also black and the wings hyaline. Length of the male 0.15, of the female 0.20. Numbers of this insect may sometimes be met with on grape vines, about the last of July, and a few stragglers remain into October. The *anticonigra* of M. Fairmaire, (Ann. Soc. Ent., 2d series, iv. p. 498,) differs from this species only in having the fore wings with coarse black cr brown veins. All of the many specimens which I have met with in the state of New-York, have the wing veins colorless. This insect and the *calva* of Say, which is slightly smaller and shining black, with the face, shanks and feet dark yellowish, the tip of the thorax and abdomen pale greenish, and the wings hyaline, are the only New-York species of *Acutalis* which I have discovered, although several others occur in Pennsylvania and farther south, and some of them are quite numerous upon the kinds of vegetation which they infest.

104. VINE LEAF HOPPER, *Erythroneura Vitis*, Harris. (Homoptera. Tettigoniidæ.)

Pale yellow with two broad blood-red bands and a third dusky one on the apex, the anterior band occupying the base of the thorax and of the wing covers and scutel, the middle one ending in a much narrower nearly square black spot situated on the middle of the outer side of the wing covers. Length 0.13. Though so small such swarms of these insects sometimes gather on the vines in August and bleed the leaves so freely that they become dry and stiff and of a yellow color, as when fading in autumn. See Harris's Treatise, p. 198.

There are numerous kinds of little leaf hoppers similar to those of the vine. Hitherto they have all been included in the genus *Typhlocyba* by authors. In consequence of their diminutive size they have been less investigated than the other insects of the order to which they pertain. The number and arrangement of the veins in their wing covers and wings, present such differences as would probably have induced authors to separate them into distinct genera, before this day, had they been of larger size and better known. The species, moreover, are so numerous, and will be so largely increased no doubt by future discoveries, that as a matter of convenience a separation among them appears to be required. The characters assigned to the genus *Typhlocyba*, by different authors, are very confused and contradictory, as they have been drawn from one or another of the species, some defining it as with, others, without ocelli, etc. I was, hence, wholly at a loss with respect to the insects which it was

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proper to include under this genus, several years since, when arranging and naming the New-York Homoptera in the State Cabinet of Natural History. The new genera *Erythroneura* and *Empoa* thus came to be proposed by me, for the reception of a portion of these insects. The characters on which these genera were founded, I since learn, make them the equivalents of some of the leading sections into which the genus *Typhlocyba* is divided by Burmeister, Zetterstedt, and others. These names may, therefore, remain for distinguishing those species in which the veins of the wings are less numerous and fully developed than they are in *Typhlocyba* proper. The insects in question will thus be divided as follows:

TYPHLOCYBA. Wing covers bordered on the hind part of their inner side by a submarginal vein running parallel with the exterior edge, and commonly having a closed discoidal cell also.

ERYTHRONEURA. Wing covers not bordered; their outer apical cell four sided, or with two right angles at its forward end.

EMPOA. Wing covers not bordered; their outer apical cell three sided or with a single acute angle at its forward end.

Each of these genera or sub-genera admit of further division. About ten New-York species or prominent varieties, known to me, fall under the first of these genera, thirty under the second and eighteen under the last. Several of these are very similar to and are probably identical with European species.

105. THREE-BANDED LEAF HOPPER, *Erythroneura tricincta*, Fitch

Like the preceding, but the bands narrower, the anterior one not extended upon the base of the wing covers and the middle one not widened in its middle. Length 0.13. I originally met with this in abundance upon raspberry and currant bushes. Having since found it repeatedly upon grape vines I am inclined to think it may possibly be a variety of the foregoing species. In both the color of the bands varies, being sometimes tawny red and sometimes dusky or black.

106. VINE-DESTROYING LEAF HOPPER, *Erythroneura Vitifex*, new species.

Yellowish white, the wing covers with oblique confluent blood red bands and a short oblique black line on the middle of their outer margin; thorax commonly with three red stripes, the middle one forked anteriorly and confluent with two red stripes on the crown of the head. Length 0.12. When the wing covers are closed they appear red with a cream colored spot shaped like a heart anteriorly, and on their middle a large diamond-shaped spot with a small red spot in its centre. It resembles an individual of the *comes* of Say, having the red spots so enlarged as to all run

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together, but the marks upon the thorax are totally different from those of that species. I have sometimes met with this leaf hopper in such numbers upon the grape vine, in September, that when the leaves were agitated, the insects taking wing resembled a shower of snow flakes. I have also reared it from pupæ found upon the leaves sucking their juices. The young begin to appear a month or two earlier than the perfect insects, and resemble them, but are smaller and destitute of wings. And their cast skins, delicate, milk white, retaining the form of the insect that has left them, may everywhere be noticed adhering to the leaves.

107. WOUNDED LEAF HOPPER, *Erythroneura vulnerata*, Fitch.

Tawny yellowish, sometimes tinged with red, the wing covers with white dots and veins and on the middle of the outer margin an oblique black streak between two cream white spots, the hind one smaller and with an oblique blood red line at its end; tips smoky blackish. Length 0.12. Common in September.

108. COQUEBERT'S OTIOCERUS, *Otiocerus Coquebertii*, Kirby. (Homoptera. Fulgoridæ.)

A slim four-winged fly of a yellowish white color with a bright carmine red stripe along each side of the body and wings, which stripe is widely forked at its hind end. Length 0.42. I have met with these delicate pretty flies from the middle of July to the end of the season, more frequently upon the wild grape vine than on any other plant or tree, but they are never so numerous as to do any perceptible injury, and are chiefly interesting to us as pertaining to a genus peculiar to the United States, and very remarkable for possessing long slender cylindrical appendages attached to the base of their antennæ, nothing analogous to which are found in any other insects. These appendages vary in their length and form in different species. They resemble a slender tapering worm, irregularly crooked, lying upon and rigidly appressed to the cheeks of the insect's face and sometimes passing over the eye. The use of these curious appendages will form an interesting subject for the investigation of some future naturalist of this country. Mr. Kirby long ago described eight species of these singular insects from specimens found in Georgia by Mr.

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Abbot. To these I have recently added a ninth, and two additional species are now known to me, the characters of which may briefly be stated in this place.

109. *Otiocerus Signoretii.* Pale yellow; wing covers with a broad dusky cloud-like stripe from the base to the middle of the inner margin, and extending thence obliquely across to the outer margin at its tip, and sending a very broad branch to the tip of the inner margin; a large blackish dot anteriorly, on the inner side of the dusky stripe, situated in the middle of the subaxillary cell, and four dots on the outer side of the stripe, placed at the angles of an imaginary square, the outermost one of these dots being in the middle of the outer or costal cell; veins yellow, posteriorly red; wings whitish hyaline, their veins red; keels of the upper side of the head minutely toothed, those of the frontal and lower side edged by a slender coal black line. Length of the body 0.20; width of the spread wings 0.60. The antennæ are short, scarcely reaching to the eye, and have but one appendage of about the same length in males. This species is similar to *Reaumurii*, but the dots on the wing covers are differently placed. Two specimens from west of Arkansas, from W. S. Robertson.

110. *Otiocerus Amyotii.* Light yellow; wing covers pale sulphur yellow, with a brown stripe from the base to the middle of the inner margin and thence to the outer tip; a row of blackish dots on the hind edge alternating with the ends of the apical veins, and about six dots forward of the innermost of these, placed on the tips of the subapical and on the bases of the apical veins; three brown stripes on the thorax; an orange red stripe on each side of the head, from the eye to the forward edge below the apex. Length 0.25, to the tip of the closed wings 0.40; width of the spread wings 0.70. I have hitherto supposed this to be the *Wolfii* of Kirby, but having recently captured an individual of that species, the differences between these two insects become evident to me. The *Wolfii* possesses each of the characters above assigned to the *Amyotii*, but the orange stripe on each side of the head is more faint and runs obliquely upward to the apex of the head, where it ends in a short coal black line, exactly as stated by Mr. Kirby; and the wing covers have three distant blackish dots in a row, outside of the brown stripe, one of these dots being placed near the base of each of the discoidal cells. In both of these species the females have two long appendages to the antennæ. The insect described by Amyot and Serville, and by Spinola, under the name *Stollii*, certainly is not the *Stollii* of Kirby, which is a dark colored species like the *Degeerii;* but it is in all probability the same species which I have described above. I have met with this insect in only two instances in this State, and once in New Jersey. All the specimens were females and were found upon hickory leaves.

111. *Anotia Westwoodii.* Another genus of insects peculiar to this country and closely resembling the preceding, except that they are destitute of appendages at the base of the antennæ, was brought to light by Mr. Kirby, in connection with the *Otioceri*. Only a single species of this genus, named *Anotia*

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Bonnetii, has hitherto been known. We have in the state of New-York an insect of this kind which may frequently be met with upon grass and on willows in lowland meadows, from the beginning of August till the end of the season. I have hitherto supposed this to be the *Bonnetii;* but now, when I come to compare a number of specimens with Mr. Kirby's description, it becomes plain to me that this is a distinct species, and I therefore name it in honor of the distinguished British entomologist who has furnished to the Linnæan Transactions a valuable paper upon some of the insects of this group. In all the species of *Anotia* several oblique veinlets of a blood red color appear along the outer sides of the wing covers towards their tips; but our New-York species differs from the *Bonnetti*, in that the wing covers have no tint of yellow, and none of their veinlets are black. The veins and veinlets are pallid, and for the most part are broadly margined with pale brown, which color also forms an irregular band before and another behind the middle, leaving large whitish hyaline spots in the intervals. The rib vein commonly shows three or four blackish alternations forward of its middle, and there is also a short black streak upon the middle of the inner margin. The wings are whitish hyaline with a blue iridescence, and their veins are slender and whitish with the veinlet at the apex of the outer discoidal cell robust, black, and slightly margined with brown. The thorax is pale yellow, smooth and shining, with three elevated white longitudinal lines. Length 0.15 to tip of the wings 0.26; width 0.45.

Two other species of this genus are known to me, the distinctive marks of which may here be stated. They are the same size with the preceding.

112. *Anotia Burnetii* is much nearer related to *A. Bonnetii*, the three veinlets in the disk of its wing covers being blackish, but it is readily known from the other three species by a black stripe above along the middle of the three first segments of its abdomen. It is white, its wing covers milky white and subhyaline, with faint clouds of a more dusky tinge forming about three imperfect bands. A single specimen was captured by Albert Gallatin Burnet, upon ash bushes beside Henderson river in Illinois. The insects of this genus hence appear to inhabit low humid situations, whilst those of the genus *Otiocerus*, according to my observations, all occur upon bushes growing in dry uplands.

113. *Anotia Robertsonii* is very similar to the *Burnetii*, appearing to differ only in having the tips of its antennæ and its feet blackish or dusky and the back of its abdomen white without any blackish discoloration. Two specimens sent me from west of Arkansas, by W. S. Robertson.

I here subjoin a short account of two other singular insects pertaining to this family, as I have for several years been sending specimens of them abroad with merely the name by which they are ticketed in my private collection appended to them. They are most nearly related to the *Caliscelis Bonelli* of Latreille, an Italian species very rare in collections, for a specimen of which I am indebted to Dr. Signoret of Paris. This insect is commonly made the type of a distinct tribe or sub-family by authors, it differs so prominently from all its kindred. Twenty years ago an insect possessing similar distinctive char-

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acters with the *Caliscelis* was found at Mount Pleasant in Ohio, by Mr. Foster, the comrade of Mr. Doubleday, in his entomological tour in this country. It has the head prolonged forwards and downwards in a protuberance which gives it considerable resemblance to a weevil of the genus *Bruchus*. It was hence described under the generic name *Bruchomorpha* by Mr. Newman, the species being named *oculata*. Six additional species belonging to this genus are now known to me. These have all been discovered by Mr. Robertson west of Arkansas, and some of the same insects I have gathered in Illinois and have received from correspondents there. They occur in grass and subsist on its juices. Much the most common species I name:

114. *Bruchomorpha dorsata.* This is black and shining, with a pale yellow stripe along the middle of its back from the front to the tip, its legs being also pale yellow with a dusky stripe on the thighs. Length 0.16. Mr. Robertson has discovered individuals having the wing covers and wings fully developed, showing that it is a pupa which is described by Mr. Newman. Or it may be as Mr. Westwood suggests in a letter to me, that these insects, like some of the *Nepidæ* and other species belonging to this order, attain to puberty and perish without acquiring wings, whilst in other individuals of the same species the wings become fully developed. An individual which I captured in Illinois in October, I preserved alive in a vial more than a month, supplying it frequently with fresh grass. During that time its rudimentary wing covers did not appear to make any advance in size. And at so late a period in the season we should expect it to be grown to the full dimensions which it is its ordinary habit to attain. These facts render it highly probable that Mr. Westwood's supposition is correct. But be this as it may, those individuals whose wings are rudimentary will always be the specimens found in cabinets and from which the species will be chiefly studied, since they are so much more readily captured and show the same colors and marks which belong to the full winged individuals. Mr. Robertson informs me these insects are very shy and timid, and difficult to obtain; they leap with surprising agility, throwing themselves some eighteen inches at a single bound; and like other insects, when their wings are fully grown they become still more spry and active. Hence specimens having the wings perfect will always be comparatively rare in collections.

115. *Naso Robertsonii.* Closely related to *Bruchomorpha* is another insect in which the protuberance of the head instead of being compressed is cylindrical and abruptly enlarged at its apex into a smooth polished black knob of a spherical form, thus resembling a species of *Bruchus* with a drop of liquid pitch adhering in a globule to the end of its beak. I hence name the genus from the Latin, *naso*, having a great nose. This insect is of a dull pale yellow color, with an elevated line along the middle, its whole length, on each side of which the head and thorax have numerous coarse black punctures symmetrically arranged in rows, and there are two oblong black spots above, upon the beak, two round ones between the eyes and two smaller ones upon the scutel. The segments of the abdomen are occupied with little short black furrows running lengthwise. The wing covers are rudimentary, covering the

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basal half of the abdomen, and are black with a net work of irregular coarse elevated veins of a pale yellow color and an elevated dot of the same color in the centre of most of the cells. Length 0.18. Several specimens have been sent me from west of Arkansas by Mr. Robertson, and I also found it in Illinois.

116. VINE APHIS, *Aphis Vitis?* Scopoli. (Homoptera. Aphidæ.)

A plant louse is reported as very destructive to the leaves and young shoots of the grape at the south, which perhaps is the same insect which infests the vine in the southern parts of Europe, but as no description of it is given we are unable to judge whether it possesses any resemblance to the foreign species. See Patent Office Report, 1854, p. 79.

2. Forming excrescences upon the leaves.

117. GRAPE LEAF LOUSE, *Pemphigus Vitifoliæ*, Fitch. (Homoptera. Aphidæ.)

Early in June, a small globular gall the size of a pea, growing upon the edges of the leaves, of a red or pale yellow color and its surface somewhat uneven and woolly, with a cavity inside, in which is a pale yellow louse of a flattened hemispherical form, with short blackish feet. Length 0.04. See Transactions, 1854, page 862.

3. Worms eating the leaves.

118. VINE DRESSER, *Chærocampa Pampinatrix*, Smith and Abbot. (Lepidoptera. Sphingidæ.)

Eating the leaves and nipping off the fruit stalks, causing the clusters when but half grown to drop to the ground; a thick cylindrical worm, tapering anteriorly, its third and fourth rings thicker and slightly humped, a short horn at the end of its back, forward of which is a row of five round rusty yellow or clay colored spots, surrounded except on their fore side by pale yellow; ground color pale green freckled with pale yellow dots, when mature changing to pale dusky olive with a dusky stripe on each side of the back, below which is a broad bluish or pink white stripe sending five branches obliquely downward and forward

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Length 2.25. The pupa under leaves on the ground, in a slight cocoon, giving out the moth the following June, which hovers about flowers at twilight, like a humming bird, (as do all the other moths of this family,) and may be distinguished by its hind wings which are rusty orange yellow without any spots or border of a different color. Width 2.00 to 2.75. See Harris's Treatise, p. 149.

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119. SATELLITE SPHINX, *Philampelus Satellitia*, Lin. (Lepidoptera. Sphingidæ.)

In August and September a thick smooth worm resting with its head and neck drawn in, making the anterior end blunt and thickest; when young pea green with a tail standing upward and curved forward like that of a dog; when older with a glassy eye-like spot in place of the tail, and of a velvety olive brown color paler on the back, freckled anteriorly with black dots and along each side five or six large oval bright cream colored spots with the breathing pore resembling a black dot in each spot. Length 3.00. Buries itself in the ground, the moth appearing the following July, its hind wings with an olive green border having a large blackish cloud on its anterior edge, forward of which these wings are pale greenish gray with a large black spot on the middle of their inner margin. Width 4.00 to 4.75. See Silliman's Journal, vol. xxxvi, p. 299.

120. ACHEMON SPHINX, *Philampelus Achemon*, Drury.

A worm like the preceding, but with the edges of the cream white spots scalloped, producing a moth having the hind wings pink red with a dusky border in which is a row of small black spots becoming faint towards the outer margin. Width 3.00 to 4.00 See Harris's Treatise, p. 248.

121. AMERICAN FORESTER, *Procris Americana* Boisd. (Lepidoptera. Anthroceridæ.)

In August, standing in a row side by side on the under surface of the leaf, eating its edge and leaving only the coarse veins; little yellow worms about 0.60 long and slightly hairy with a transverse row of black spots on each ring; forming thin tough oblong oval cocoons, in crevices; the moth appearing the follow-

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ing July, wholly of a blue black color except the neck, which is bright orange yellow, its body ending in a broad fan-like notched tuft. Width 0.90. Much more common at the west and south than in New-York. See Harris's Treatise, p. 257.

122. EIGHT-SPOTTED FORESTER, *Alypia 8-maculata*, Fab. (Lepidoptera. Anthroceridæ.)

The last of June, a white or light blue cylindrical worm banded with black lines and on the middle of each ring a broader orange yellow band dotted with black, and posteriorly upon each side a conspicuous white spot; growing to 1.25 in length, leaving the vines about the middle of July, and inclosing themselves in slight webs upon the ground. The moth appearing in May, black with orange shanks, each of the fore wings with two large light yellow spots, the hind ones with two white ones. Width 1.00 to 1.50. This is a common insect at the south, and Mr. Calverley informs me he has frequently captured it around New-York. It has also been found occasionally in the vicinity of Albany.

123. BEAUTIFUL WOOD NYMPH, *Eudryas grata*, Fab. (Lepidoptera. Notodontidæ.)

In July and August, a worm in all respects like the preceding one, except that it has no white spot on each side and is slightly humped above at its hind end; burying itself three or four inches in the ground, and there passing the winter in its pupa state, the moth coming out in July. This has the fore wings milk white, bordered behind, and also on their outer side from the base to the middle with rusty brown edged on the inner side with greenish olive, and with a wavy bluish white line on the hind edge at the base of the fringe; hind wings nankin yellow with a blackish brown border which does not extend to the outer angle. Width 1.65 to 1.85. See Harris's Treatise, p. 330.

124. PEARL WOOD NYMPH, *Eudryas unio*, Hubner.

This is equally as common as the preceding, and the worms are so much alike that we as yet know not whether there are any marks whereby they can be distinguished from each other. The moths too are very similar, but the present species is somewhat smaller, and has the border of the wings paler and of a tawny

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red color, with the olive inner edge wavy instead of being straight as it is in the foregoing species, and on the hind wings this light red border is extended to the outer angle.

If these pretty zebra-like worms become so numerous upon the vines that it is desired to exterminate them and the handsome moths which they produce, this object will probably be most readily accomplished by picking off each leaf on which a worm is found and throwing it into the fire or otherwise destroying it. Mr. T. B. Ashton, of White Creek, informs me that in 1854 he found upwards of 150 of these worms on his vines, which being destroyed, only one worm made its appearance the next year. He also says, when the worms leave the vines, if they can find a corn cob or a piece of soft decayed wood lying on the ground, they bore into it rather more than the length of their bodies, closing the orifice with their chips, and there pass their pupa state, in preference to burying themselves in the ground. All such observations as this are of value to us, and are not matters of mere idle curiosity, as ignorant persons suppose. If the fact be as above stated, it occurs to me that whenever these worms are noticed to be common upon the vines, their further multiplication may be arrested with the greatest facility by scattering broken corn cobs upon the ground beneath, where the worms when they descend from the vines will find and will enter them, and in the autumn or spring following, raking these cobs together in a heap and burning them.

195. WHITE MILLER, *Spilosoma Virginica*, Fab. (Lepidoptera. Arctiidæ.)

A large thick-bodied caterpillar two inches long, densely covered with soft long hairs of a pale yellow, sometimes foxy red or brownish color, its skin straw yellow, commonly with a black stripe along each side, with the joints of its body and its under side also blackish. This and the caterpillar of the Isabella moth (*Spilosoma Isabella*) which has hairs much more stiff and even shorn at their ends and of a fox red color and black at each end of its body, are the two common large caterpillars seen everywhere in the State of New-York, especially in autumn, often crawling into our dwellings and spinning their cocoons behind chests and other furniture. Out of doors they place their cocoons slightly

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attached to the under side of boards, billets of wood, and in similar sheltered situations. The cocoon is about 0.85 long, oval with the ends rounded, of a dirty gray or pale brown color, and with the hairs of the caterpillar woven into its outer surface. The moth of this species is most common in May and June, but specimens occur at all times, coming out even in winter in stove-warmed rooms in which caterpillars have happened to secrete themselves. It is snow white with a black dot in the centre of its wings, and the hind part of its body has a row of black spots above and another along each side, with a bright ochre-yellow stripe between, and the forward hips and thighs in front are also of this last color. Width across the wings 1.50 to 2.00. The caterpillars are not stationary, but wander about and feed on a great variety of leaves, eating their edges irregularly; and they seem to regard the texture rather than the taste of their food, for I have noticed them in the greatest numbers upon trees and plants whose leaves are most soft and tender, withering from the slightest touch of frost, such as the convolvulus, bean, grape, butternut, &c. See Harris's Treatise, p. 268.

126. SPOTTED-WINGED SABLE, *Desmia maculalis*, Westwood. (Lepidoptera. Pyralidæ.)

The side of the leaf rolled into a cylinder and tied with silken threads, with a slender slightly tapering worm residing therein, 0.90 long, leaf green, having a black U-shaped mark upon its neck and black spots upon the following ring; the pupa formed in the same place, the moth coming out the last of June and in July, of a black brown color with two large roundish snow-white spots on the fore wings and the hind wings with a white band across the middle, (broken apart in the female,) and with two white bands on the abdomen. Width 0.75 to 1.15. This may frequently be met with in all parts of the United States. The males are readily distinguished from all the other insects of the order Lepidoptera by a most remarkable peculiarity. Their antennæ are elbowed, similar to those of the weevils, and ants and bees. They have a little brush-like tuft of hairs in their middle, jutting out upon one side, their first joint being long and thickened towards its tip. See Patent Office Report, 1854, p. 78.

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GRAPE. LEAVES.

127. GARTERED PLUME, *Pterophorus periscelidactylus*, Fitch. (Lepidoptera. Alucitidæ.)

Consuming the young leaves, in June, and hiding itself in a hollow ball made of one or more leaves drawn together by silken threads; a cylindrical pale green worm, nearly half an inch long, with rows of white elevated dots sending out radiating white hairs, the pupa suspended by its tail and hanging with its head downwards, and in about a week giving out the moth, early in July. The moth tawny yellow, its wings split into long narrow lobes, the fore pair with three white spots and beyond these two white bands, the fringe white with a blackish spot on the middle and another on the apex of the inner margin. See Transactions, 1854 p. 843.

4. *Insects eating the leaves.*

128. GRAPE-VINE FLEA-BEETLE, *Haltica chalybea*, Illiger. (Coleoptera. Chrysomelidæ.)

Early in spring, eating holes in the buds and leaves, a small oblong oval flea-beetle, 0.16 long, polished and sparkling, of a deep greenish blue color, some of the individuals often deep green, purple or violet, their under side dark green and their antennæ and legs dull black. This sometimes invades the plum also, as mentioned p. 362, and it also infests the elm and the alder. Its winter retreat is in crevices of the bark and in the earth immediately around the root of the tree on which it feeds, and its colors are then much less bright and sparkling than in summer. See Harris's Treatise, p. 114.

Chevrolat in Dejean's Catalogue has cut up the Chrysomelidæ into a multitude of genera. Whether the divisions which he has instituted should be received as anything more than subgenera appears doubtful. But however this may be, Linnæus originally gave the name *Altica* to a section or subgenus of *Chrysomela*, which has since been currently admitted to the rank of a genus, with a slight rectification by some authors in the orthography of its name. The species *oleracea* being originally placed at the head of this genus, must be regarded as its type. Therefore, whatever may be the destiny of M. Chevrolat's other proposed genera, that which he names *Graptodera*, under which *oleracea* and our American *chalybea* are arranged, can in our view be regarded only as a synonym. Nothing stable and permanent can ever be reached in this part of the science, if old generic names are to be cast overboard in this summary manner.

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The *Eumolpus Vitis* which often sadly devours the vine leaves in southern Europe, Kirby states to be common in New-York and Canada; but I think this is a mistake.

The ROSE-BUG, No. 50, is one of the greatest pests to the vine, in neighborhoods where it abounds.

129. LIGHT-LOVING ANOMALA, *Anomala lucicola*, Fab. (Coleoptera. Melolonthidæ.)

The fore part of July beetles resembling in their appearance the May-beetle, No. 76, but of a much smaller size, being only about 0.35 long, become common on both wild and cultivated grape vines, feeding upon the leaves. From their colors and marks they would appear quite plainly to be of at least four very distinct species, and Fabricius has named and described three of them as such. But as they are always found associated together, and similar insects in Europe vary similarly in their colors, it is probable they are as authors have supposed, mere varieties of one species. They may be distinguished as follows:

1. The GLOOMY ANOMALA (*A. mœrens*, Fab.,) of a pale dull yellow color, the thorax sometimes reddish, and with the knob of the antennæ and the middle of the breast black.

2. The SPOTTED NECK (*maculicollis*,) like the preceding, but with a black stripe or large spot on each side of the middle of the thorax, and often the hind part of the head and the outer side of the wing covers also black.

3. The LIGHT-LOVING (*lucicola*, Fab.,) pale dull yellow with the thorax black except on each side and on the middle of its hind edge, the hind part of the head, the scutel and under side of the body being also black, with the abdomen brown or sometimes dull yellowish.

4. The BLACK (*atrata*, Fab.,) black throughout, the abdomen commonly tinged slightly with pale. See Harris's Treatise, p. 29.

130. SPOTTED PELIDNOTA, *Pelidnota punctata*, Linn. (Coleoptera. Scarabidæ.) [Plate ii, fig. 6.]

A large broad oval beetle of a pale brownish yellow color, with a black dot on each side of the thorax and three others along the outer side of each wing cover, as represented in the figure on

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plate ii, may almost always be found on grape vines, in July, August and September, and numbers of them frequently occur upon the same vine. See Harris's Treatise, p. 22.

131. WHITE FLOWER-CRICKET, *Œcanthus niveus*, Degeer. (Orthoptera. Achetidæ.)

Mounted among and feeding upon the leaves of the vine, in August, a slim narrow cricket about 0.70 long, of a clear white color throughout.

The genus Œcanthus to which this insect pertains, was founded by Serville upon a species common in the south of Europe, named *pellucens* by Scopoli, for specimens of which, with many other European Orthoptera, I am indebted to M. Brisout de Barneville. Congeneric with this European insect we have three species in the United States, which are but little known, although they were named and described by Degeer nearly a century ago, and two of them are so common in the State of New-York that their song is often heard upon the vines and bushes in our yards, night after night, through the latter part of summer. And as they are on several accounts an interesting and singular kind of cricket, I here present the investigations which I have made relating to them.

The European and our American flower crickets all bear a striking resemblance to each other, both in their external appearance and their habits, showing this to be one of the most natural genera in the family to which they pertain. They also differ very much from all the other crickets. They are mostly of a clear white color instead of black or dull brown which are the prevailing colors among the insects of this group. Their form also is long and narrow, particularly in the females, which have the wings wrapped more closely around the body than they are in the males. Their hind legs also are long and slender, resembling those of a grasshopper more than a cricket; and their hind feet have four joints, all the feet in other crickets having three joints only. Brulle, who subjected the European species to a rigid examination, and was the first to detect the number of joints in its feet, and some other important points in its structure, states (Hist. Nat. des Ins. vol. ix, p. 174) that the thorax of this

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genus is of a conic form and narrower towards the head than at the opposite end, and Serville repeats this, as being one of the most prominent characters whereby the insects of this genus may be distinguished. But, as we shall see, the form of the thorax varies greatly with the species, and approaches a conic form in only one of our American flower crickets. The other marks, however, which we have stated above, will suffice for readily distinguishing the insects of this genus.

In their habits they also differ remarkably from other crickets. The observation of Latreille, that they dwell upon plants and are pleased with flowers, applies with considerable exactness to our American species, which may be met with in autumn quite common upon the flowers of the golden rod (*Solidago*), and in August I have noticed them on rose bushes, several individuals being sometimes seen on one bush. It was from this statement of Latreille that Serville gave the generic name *Œcanthus* to these insects, this name being formed from two Greek words, implying "I dwell in flowers." But any situation where the foliage is dense, furnishing them a cool shady hiding place, appears to be what they particularly desire, as they occur quite frequently on grape vines, on young oaks and other bushes, where no flowers are near them. All other crickets it will be recollected reside upon the ground, in holes under stones, and similar situations. And it has been noticed of these insects and their kindred, that a peculiarity in the structure of their feet appeared to be essential to adapt them for the situations in which they reside—the catydids and other insects which dwell upon shrubbery having soft flat cushion-like soles to their feet, to enable them to cling to the stalks and leaves of plants, whilst in the crickets and other insects which reside upon the ground no such structure exists, (Westwood, Introd. i, 441.) The flower crickets, however, appear to present an exception to this rule. They always reside upon plants, elevated from the ground, and yet the under sides of their feet are simple and merely covered densely with bristles, like those of other crickets. But perhaps this is no just exception to the rule stated. Though they dwell on plants, they do not travel about upon them, but remain stationary, each one in his own chosen abode, day after day. So I infer, from having

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noticed the song of one of these insects proceeding from the same spot upon a mass of vines or upon a particular limb of a tree, upon each evening for a number of nights in succession. And it is quite probable therefore, that the simple structure of their feet incapacitates them for clinging and leaping about from one leaf to another.

Some of our most important information respecting the habits of the flower cricket we obtain from a Memoir published in Italy more than a century ago, by M. Louis Salvi, no subsequent writer appearing to have observed the same facts. From him we learn that the female with her awl-like ovipositor pierces upon their under side the green succulent stalks of the vegetation on which she resides, to the very pith, and crowds commonly only a pair of eggs into the nest thus formed. A number of these punctures are made near each other, till her whole supply of eggs is disposed of. The eggs remain till near the middle of the following summer, when they give out the young crickets, which resemble their parents in form, except that they are without wings. They secrete themselves in the thickest masses of leaves, until they get their growth, changing their skin several times.

In the southern part of our State the song of the flower cricket begins to be heard as early as the first of August, but it is a week later before it commences in the vicinity of Albany, and later still in the more northern parts of the State. Perched among the thick foliage of a grape vine or other shrubbery, some feet up from the ground, and as already stated, remaining in the same spot day after day, its song begins soon after sunset and before the duskiness of twilight arrives. It is distinctly heard at a distance of several rods, and the songster is always farther off than is supposed. Though dozens of other crickets and catydids are shrilling on every side at the same time, the peculiar note of this cricket is at once distinguished from all the rest, consisting of repetitions of a single syllable, slowly uttered, in a monotonous melancholy tone, with a slight pause between. The children regard this cricket as no votary of the temperance cause; they understand its song to consist of the words *treat—treat—treat—treat*, which words, slowly uttered, do so closely resemble its notes that they will at once recall them to the recollection of almost

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every reader. And this song is thus continued without the slightest variation and without any cessation, I think, the whole night through. I however have sometimes heard it at the first commencement of its evening serenade uttering three syllables resembling the words *treat, treat, two; treat, treat, two*—as though the songster was supplicating a libation for his voiceless female mate as well as himself—a longer pause following each third note. This prelude is probably performed in limbering or otherwise adjusting his organs, preparatory to performing the regular carol, which is struck into in a few moments.

It merits, in passing, to be remarked, that whilst the song of the common cricket of the eastern continent aids in producing sleep and has been so much valued on account of this property that it has in some countries been made an article of traffic, and inclosed in cages is placed in the dormitory, the song of our flower cricket has exactly the opposite effect. Occasionally, from vines growing in front of the window, one of these little musicians will find his way into the bed-chamber, when, as Dr. Harris observes, his incessant and loud shrilling will effectually banish sleep. Perhaps the lodger out of all patience at last gets up and makes for the spot from whence the annoyance proceeds; but the song abruptly ceases with his approach. He however fumbles around in the dark, beating upon the wall high and low, and probably encountering an unexpected number of chairs and washstands, till he flatters himself he has destroyed his tormenter or has at least frightened him into silence for the rest of the night. Then returning to his pillow and adjusting himself again for sleep, he is able to exult in the sweet stillness that pervades the apartment, for a moment only, before the same execrable creaking breaks forth again as shrill and vigorous as before.

Many persons have noticed the catydid when singing, so far as to see that it is by rubbing its hind legs against the outer sides of its wing covers that its stridulation is produced. In the cricket, however, the hind legs are much shorter, and here we find that it is not by them but by raising its wing covers slightly so as to rub the under surface of one of them against the inner edge of the other that its song is caused. As the flower crickets have long slender hind legs similar to those of the catydids, we might sus-

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pect their note to be produced in the same manner. We however find that in this as in so many other points they are related to the crickets. And when we come to examine their wing covers, we are able to discover the very curious apparatus by which their stridulation is produced; and we find a peculiarity in its structure which at once explains why it is that the song of this insect consists of a single note always followed by a full pause or total cessation of the sound, instead of being continuous or nearly so as it is in other crickets.

In the males the wing covers are flat and placed horizontally upon the back, with their outer third turned perpendicularly downwards and covering the sides. They are very thin and transparent, like clear glass, and may be compared to a window, with the veins like the sash dividing them into a number of panes or cells of various sizes and shapes. The four largest of these cells are placed in the disk or middle part of the wing, and are divided from each other by three straight veins, crossing the wing obliquely, the two hind ones parallel with each other, the forward one meeting these at a right angle and forming with them the likeness of a very full-faced letter V impressed transversely. They thus resemble stout braces so placed in the wing as to keep the ribs and other longitudinal veins pressed asunder, hereby putting on the stretch the delicate membrane which forms the panes between the several veins. Thus each of these panes is like the head of a little drum or tabor, and when played upon, all vibrating at the same instant produce the one shrill note which this insect utters. And to augment the sound still more, it may be observed that the membrane forming each one of these panes is not a simple smooth surface, but is striated with numerous little elevated lines.

It now remains for us to describe the curiously constructed instrument by which all these little tabrets are excited into vibration. On the inner margin of the wing cover, at the anterior end of the V-like mark above described, will be seen a small thickened or callous-like spot from the fore part of which four veins extend to the base of the wing. The inner or hindmost one of these is the most thick and stout, and when particularly inspected it is found to be in several respects different from all the rest of the

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veins. It first runs straight inwards, almost transversely, and then abruptly turning extends with a curve to the base of the wing, this curved portion being more slender. On the upper or back side of the wing this vein is pressed strongly downwards, whereby a furrow is formed in the surface above it. On the under side it stands out from the surface in bold relief, forming an elevated ridge. Now it is this prominent ridge which is applied to the inner edge of the opposite wing cover, and as it runs transversely it will at once be seen that when the wing covers are slightly spread apart and closed again, the motion will draw this ridge up and down against the edge to which it is applied, precisely like the bow of a violin playing upon the strings. This vein may therefore appropriately be named the fiddle-bow, M. Goureau the only one who has particularly described these parts in the common cricket having given to it the corresponding French term *archet*. But if this vein were smooth like the other veins it obviously could produce no vibration. It would be like a fiddle-bow when greased. On examining it therefore with a magnifying glass in a strong light, an appearance like that of very fine transverse lines may be discovered. And on being placed in a microscope the real structure of this part may plainly be seen. What at first appeared like fine transverse lines is found to be a regular row of little flat cogs or teeth, resembling the front teeth of man, but rather more broad than high and slightly narrowed into a neck at their bases. They are inserted at short distances apart, somewhat as the nails of the fingers appear when the end of one finger is placed upon the top of another in a row. It is but a short portion of the most projecting part of the vein that is occupied by these teeth—little more than the twentieth of an inch in length; and in that short distance twenty-one teeth are inserted, with intervals between which are more than double the length of the teeth. The teeth do not stand perpendicular to the surface, but incline towards the inner margin of the wing cover, and that portion of the vein which is studded with them is about the tenth of an inch from the inner edge. We shall now be able to understand the cause of the several peculiarities in the stridulation of this insect. It will readily be perceived that its fiddle-bow being drawn against the edge of the opposite wing cover, and the teeth

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with which it is furnished grating thereon will cause such a jar in the sash or frame work of both wing covers as will impart a brisk vibration to all the little tabrets or membranous cells which are placed in this frame work. And the shrillness of the note of this insect is due to the extreme thinness of the membranes and the violent vibrations into which they are thrown by the sharp grating which these projecting teeth of the fiddle-bow with the little intervals between them produce. As the teeth incline inwards they act only when the wing covers are shutting together; when they are opening apart no grating can occur. It hence results from this peculiar mechanism that as the wing covers are successively opened and closed, notes and intervals of about equal length are alternately produced. The row of teeth moreover being so short, they can cause a vibration of only a moment's duration, and it is not in the power of the insect to produce a continuous sound or a prolonged note. The reason of the several differences between the song of this and of the common cricket, whose stridulation has been described with so much exactness by M. Goureau (Annals Soc. Ent. vol. vi, p. 34) are all readily explained by the differences which we find in the structure of the wing covers in these two insects. In the common crickets both of Europe and of this country, the fiddle-bow instead of projecting teeth is merely furnished with elevated transverse ridges or ribs, and these occupy its whole length. Hence its note is more prolonged and far less loud and shrill than that of the flower cricket. M. Goureau was able in the dead insect to so move its wing covers whilst they were still pliant, as to produce the same sound which it utters when alive; and by merely scratching with a pin upon the fiddle-bow he found this sound was produced, though more feeble, as but one wing cover was hereby vibrated.

The WHITE FLOWER CRICKET measures about 0 50 to the tip of its abdomen and its total length is about 0.70. It is of a milk-white color, sometimes with a slight tinge of green. The tips of its feelers and of its feet are tawny yellowish and there is commonly a spot of the same color upon the top of its head, which is oblong and broader at its hind part, commencing between the bases of the antennæ and extending back to a line with the hind side of the eyes. The eyes in the living insect are of the same white color with the body, but after death change to a brownish clay color, though in some specimens they remain white. Upon the under side of each of the two first joints of the antennæ is a black dot, which is sometimes lengthened into a slender stripe or

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line, and in rare instances a second dot is present upon the inner side of each of these joints. The tip of the ovipositor of the females is also black. These are all the characters which are presented by the color in this insect. Numerous others, however, are derived from the form and sculpture of its several parts, of which we notice the following.

The HEAD is twice as long as wide and is inclined downwards obliquely and in the preserved specimens often perpendicularly. It is shaped like an egg, moderately flattened upon its upper side. In dried specimens it is crossed between the eyes by a wide shallow groove. The feelers or *palpi* are long and thread-like, composed of cylindrical joints, of which the penultimate one is almost as long as the last one, which is slighty thicker, long oval, and on its inner side obliquely cut off in a straight slope extending two-thirds of the length of this joint, the face of which slope is hollowed like the inside of the bowl of a spoon. They are clothed with fine erect bristles, in addition to which the last joint is densely coated with much finer prostrate hairs. The *antennæ* are double the length of the body, tapering and very slender, composed of a hundred joints or more, the articulations of which are faint and towards the apex are scarcely perceptible. The basal joint is thrice as thick as the following one, cylindric and but little longer than wide. The succeeding joints are very short, and towards the tip gradually increase in length and diminish in diameter, here sometimes showing tawny brown rings upon the alternate joints.

The THORAX is as wide as long and of the shape of a half cylinder, being rounded from above downwards, with its opposite sides parallel and its angles rounded. On each side low down it forms a thin foliaceous edge which hangs downward and curves a little outward. Both the anterior and posterior edges curve slightly upward and the latter is fringed with short pale yellowish hairs. Upon its surface posteriorly a shallow furrow may be seen along the middle and on each side of it a curved impressed line.

The ABDOMEN is long, cylindrical, soft and often much distorted in the dried specimen and discolored from inclosed alimentary matter. It ends in a pair of long slender tapering appendages which are about equal to the abdomen in their length and are clothed with fine erect whitish hairs. In addition to these in the female is the ovipositor, which is of the same length, with the appendages, reaching to the tip of the wing covers, and is of a hard horn-like substance, cylindrical and straight or very gently curved upwards.

The WING COVERS of the *male* have already been partly described. When folded together they appear perfectly flat and of the shape of an egg with its small end forward. They are rather more than half an inch long, and the breadth of their upper horizontal portion is more than half their length. Their deflected outer portion or costal area is divided by oblique veinlets into about ten cells of a rhombic form. Above these is an elongated elliptic area reaching three-fourths of the length of the wing cover, bounded on each side by two coarse longitudinal veins which are the proper ribs of the wing. This elliptic area is subdivided into several small square cells by veinlets crossing it transversely. The horizontal portion of the wing covers have two veins running parallel with the hind edge and the hind part of the inner edge. The remain-

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ing veins have already been described. In the *female* the wing covers are quite unlike those of the male, being much narrower, and wrapped more closely around the body, giving this sex a more slender form. The flattened upper portion is cut up into many small cells which are mostly square and are formed by six or seven parallel veins which arise from the base of the wing covers and from the inner rib-vein and run obliquely backwards and slightly inwards to the inner margin, and are connected to each other by numerous transverse veinlets. The deflected outer or costal area is similar to that of the males. The longitudinal rib-veins do not form any elliptic area like that in the male. The *wings* are folded together lengthwise under the wing covers, and are of the same length with them in the male, whilst in the female they are longer and project beyond their tips the eighth of an inch or more, resembling little conical tails.

The four forward LEGS are rather slender and of moderate length and clothed with fine short soft hairs. The thighs are cylindrical and have a shallow groove along their under side. The shanks are but half as thick as the thighs and taper slightly towards their tips. The forward ones near their bases are flattened and widened and show on both sides a deeply impressed oval and almost transparent spot appearing like a scar. The feet have three joints, of which the first one is long and cylindrical, the middle one is very small and only about as long as it is wide, and the last one with the claws at its tip does not differ from the same joints in the hind feet. The *hind thighs* are very long and slender, nearly equaling the tip of the wings and of the ovipositor. They are much thickened towards their bases, flattened on their inner side and strongly convex or rounded on their outer side. They have a narrow straight groove running their whole length, both on the inner and the outer side, and an elevated line along their lower edge. The *hind shanks* are also long and very slender and thread-like, equaling the thighs in their length and like them clothed with very fine short soft hairs, in addition to which they have along their hind side two rows of small sharp spines or prickles which reach almost to the knee, with three or four pairs of coarser ones towards their lower end, and a crown of coarse ones at the tip whereof two are much longer and have small thorn-like points branching from them. All these spines are white with their points black. The *hind feet* are covered with minute spines or thorn-like points, which are very densely crowded on their under sides. These feet have four joints, one more than is found in other insects of the cricket kind, but the articulation to the middle of these joints is so slight in the present species that it is often wholly imperceptible in the dried specimens. The basal joint is long and cylindrical and forms three-fourths of the total length of the foot. The second joint is of the same diameter with the first, but is quite short, only as long as wide, with the suture at its base slight and often discerned with difficulty. It is cylindrical and divided into two parts by a suture running lengthwise upon each side. The upper half forms two large stout spines, the bases of which are articulated to the apex of the first joint, their lower edge is joined by a suture to the lower half of this second joint its whole length, their tips only being free, jutting onward and overlaying the third joint more than half its length, each spine tapering to a point which is

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black and curved gently upward. The third joint is of the same length with the second but much narrower, when viewed laterally appearing twice as long as wide and of a square form with the apex cut off obliquely. The last joint is more slender and longer than the preceding two taken together, slightly arched and thicker towards its tip. At its apex two small stout and almost straight claws are articulated at right angles with the foot, and at the base of each claw is a small cylindrical pellet, half as long as the claw and of the same diameter, with its apex cut off obliquely.

The following VARIETIES of this species have fallen under my notice:

a. The black dots on the under side of the two first joints of the antennæ lengthened into short stripes.

b. First joint of the antennæ with a black transverse stripe beneath, at its apex, forming a right angle with a longitudinal stripe.

c. Two first joints of the antennæ with a black stripe on their inner and a black dot on their under sides.

d. Head without any spot or discoloration above.

e. discoloratus. The whole of the head, the first joint of the antennæ, the breast and abdomen of a brownish clay color.

f. fuscipes. One or both of the hind legs more or less tinged with blackish.

g. angustipennis. The male with wing covers a third narrower and somewhat shorter than usual, with the wings protruding like tails from under their tips. Having seen but a single specimen, I cannot regard this as anything more than a variety, since in other species of this family we meet with individuals having the wing covers but partly developed.

With the detailed description of this species which has now been given, it will only be necessary for us to state the more prominent points in which the two other flower crickets of our country differ from it.

We suppose these insects do more mischief by perforating the twigs of different trees to place their eggs in them, causing the death of the parts thus wounded, in many instances it is probable, than by eating the leaves. We are not aware that they ever become so numerous upon vines as to require any exertions for their destruction. Dr. Harris states that they were noticed in one instance piercing and placing their eggs in the branches of a peach tree, and that the tobacco cultivated in Connecticut has sometimes been injured by these crickets eating the leaves. Wherever their numbers and operations render them pernicious, the only mode we are able to suggest whereby to abate the nuisance is to pick them from the leaves by hand and destroy them.

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132. STRIPED FLOWER CRICKET, *Œcanthus fasciatus*, Degeer.

A slender white cricket very similar to the preceding, but having three blackish stripes upon the thorax, the antennæ, abdomen and legs being also black or dark brown, and the thorax narrowed anteriorly.

This is almost as common as the foregoing, in the State of New-York, and the two are often met with associated together upon the same shrubbery. And it is this insect which Dr. Harris describes as being the female of the preceding species. He evidently was unacquainted with the work of Degeer and the characters he assigns to these insects, or he would have been aware of his error, the marks by which this species is distinguished being so plain and so explicitly stated by that author. And the number of specimens which he had for inspection must have been quite limited, or he would have been aware of the fact that females occur which are of the same white color throughout as the males of *niveus*, and that males occur which have the three black stripes on the thorax and the other marks which he supposes are found in females only. And though in their size and form these two insects are most intimately related to each other, when we come to submit them to a careful inspection differences may be detected which, in addition to their colors, serve to assure us that they are really distinct species. Thus, the thorax here is plainly narrowed anteriorly, instead of having its opposite sides parallel with each other. The thin foliaceous edge at its lower margin on each side here hangs perpendicularly downward instead of being curved slightly outward. The furrow along its middle, between the centre and the hind edge, is here more deeply impressed, as is also the curved line upon each side of this furrow. In the wing covers of the male, from the convex side of the curved vein which we have named the fiddle-bow three veins are given off which are parallel and equidistant from each other, and end in a vein which runs lengthwise of the wing, these three veins obviously serving as braces to hold the fiddle-bow tense and firm for the important office belonging to it. In the present species these three veins are straight and run directly into the longitudinal vein at their outer ends, whilst in *niveus* they curve backwards and enter the longitudinal vein very obliquely. The feelers also are rather more

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short and thick in this species, and the slope on the inner side of the tip of the last joint is more distinct and more deeply excavated. Such are the principal differences which the specimens before me indicate as existing between these species. But as a large portion of the insects of this order are subject to considerable variations in the form and sculpture as well as the color of their several parts, it is possible that other specimens may not show all these details to be as I have represented them.

133. DOTTED FLOWER CRICKET, *Œcanthus punctulatus*, Degeer.

A slender white cricket with the head and thorax dull brownish yellow above, the thorax twice as long as wide, and the wing covers transparent with a dusky dot or small oval spot in their centre.

This probably occurs upon the same shubbery on which the two preceding species dwell. I have never met with it in New-York, though it will very likely be found within our borders, Degeer having described it from specimens taken in Pennsylvania. The male is unknown to me, the female only having been sent me from the Southern States. It is more long and slender than the other species, measuring to the end of its body 0.50, wing covers 0.60, ovipositor 0.75, and to the end of its wings 0.90. It differs so far in some important points from each of the other species that some future writer will no doubt make it the type of a distinct genus, a step which would be eminently proper should another species be discovered coinciding with this in those differences.

The *thorax* is long and narrow, twice as long as wide, and when viewed from above appears cylindrical with each end a little dilated or curved outwards. The thin foliaceous margin upon each side is turned outward almost horizontally, its hind part being widened. Upon the posterior part of the upper side is a large round impressed spot appearing as though stamped with a seal, its outer side forming a right angle. The *wing covers* in the females are but little more than half as long as the wings and are very thin and transparent, with opake white veins, whereof there are two straight longitudinal rib-veins the inner one of which is double, and the space between these two veins is divided into a number of small square cells by transverse veinlets. The deflected outer area is crossed obliquely by parallel veins connected by transverse veinlets dividing the surface into numerous cells which are mostly square, those at the base being much more small and irregular. The flat upper portion is cut up into numerous irregular cells of various sizes by a net-work of short veinlets

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anastamosing in every direction. The central dusky brown spot is placed upon the inner side of the double rib-vein, and commonly there is a more faint spot forward of this, which on its inner side is confluent with a slight cloudiness of the same color which extends from the central spots forward along the middle of the back to the base. Often also a third spot, much smaller, may be discerned in the second or third cell back of the central spot. The *ovipositor* is as long as the abdomen and perfectly straight; its sides are dark brown and its end black. The two appendages at its base are much shorter than in the other species, being scarcely half the length of the ovipositor. The *feelers* are sensibly shorter and thicker than in the other species, their penultimate joint having the form of a reversed cone, its length scarcely double its width and less than half the length of the last joint, which is thicker than those which precede it, and on its inner side is very plainly cut off in a sloping direction from the middle to the tip, with the face of this slope deeply excavated and causing the joint to appear like a hollow tube. The *antennæ* are blackish on their upper side towards the base, or have a black ring at the tip of each joint.

10. THE CURRANT.—*Ribes rubrum.*

We place this shrub and the gooseberry in this connection, as their woody stalks and the form and texture of their fruit give them such a close relationship to the grape; though they might with perhaps equal propriety be classed with the raspberry, strawberry and other small fruits of the kitchen garden.

AFFECTING THE STALKS.

134. AMERICAN CURRANT BORER, *Psenocerus supernotatus*, Say. (Coleoptera. Cerambycidæ.) [Plate ii, fig. 1.]

Feeding upon the pith of the currant and killing the stalks, a small cylindrical white worm wholly destitute of feet and with a small chestnut brown head and black jaws; passing its pupa state in the stalks and the latter part of May changing to a small slender long-horned beetle of a black color edged with chestnut brown, its wing covers each with two small gray spots forward of their middle and a white crescent-shaped one towards their tips.

In all our gardens numbers of the currant stalks perish every season. To such an extent does this mortality prevail that this fruit would soon disappear from our country were it not that the roots of this shrub are so vigorous, sending up a multitude of new

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shoots every year, whereby the places of those that perish are constantly re-supplied.

After the leaves have fallen in autumn and during the winter these dead stalks are readily distinguished from the live ones by being dotted over with a pretty little fungus the size of a pin head and of a pale bright red color and a corky texture, which I suppose to be the *Sphæria Ribesia* of Fries. Another fungus also appears on the small twigs, very similar to this but having its surface flattened and of a coal black color.

If one of these currant stalks is split asunder the cause of its death is plainly evident. Commonly through the whole length of the stalk the pith is found to have been eaten away by a worm, leaving it hollow or filled in places with a loose woody powder, like fine sawdust. Each of the branches is also found to be bored in the same manner. And lying in this cavity, one, two or more of the worms which have done this mischief are met with, in all the stalks which have recently been destroyed.

The only insect to which this injury has heretofore been imputed in this country is a kind of moth closely related to the Peach tree borer, which perforates the currant stalks in Europe in this same manner and has been brought to this country with the currant. But the past winter, on coming to inspect these worms, finding they were wholly destitute of feet, I became assured they were a different insect from that which they have all along been supposed to be. And on rearing some of them to their perfect form, I obtained in place of the European currant borer, a beetle, one of the native insects of this country whose history has hitherto been unknown, and which is nearly related to the Apple tree borer.

This insect is the *Clytus supernotatus* of Mr. Say (Jour. Acad. Nat. Sci. iii, 425) and of Prof. Haldeman, (Trans. Amer. Phil. Soc. x, 42) and the *Psenocerus Pini* of Dr. Leconte (Jour. Acad. 2d series, ii, 581) and of the Catalogue of Coleoptera lately published by the Smithsonian Institution. It would be an incongruity much to be regretted in the scientific names of the insects of our country, if this species which subsists upon the currant had received a name indicating it to belong to the pine. But fortunately this is not the case. The *Callidium Pini* of Olivier, which Dr. Leconte supposes

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to be the same insect with the *supernotatus* of Say is in reality a very different species pertaining to Dr. Leconte's new genus *Euderces*. How they have come to be pronounced the same it is difficult to understand, since Olivier explicitly states that the antennæ of *Pini* are longer than the body, whilst Mr. Say informs us they are shorter than the body in his species. Olivier's figure *a* of *Pini* is a very correct representation of the insect as it appears to the naked eye. His enlarged figure *b* is much less accurate, especially in the coloring and in placing the posterior white band too far forward. His description of this insect shows this enlarged figure to be inaccurate, and coincides so perfectly with my specimens as to leave no doubt respecting the species to which the name *Pini* belongs. The *Piniadeus* of Fabricius is evidently the same insect described more briefly and much less accurately. Both authors doubtless drew their descriptions from the same specimens, as they both cite the cabinet of Bosc as containing the insect they describe, which insect was found upon pine trees in the neighborhood of the city of New-York Olivier states, whilst Fabricius gives Carolina as its locality. The latter is probably correct, as I have never met with this insect in New-York, and know it only from specimens sent me from west of Arkansas by Mr. Wm. S. Robertson.

The whole length of the dead currant stalks and their branches, from the buds at their tips down to the surface of the ground is commonly found to have been mined by these borers. The hollow in the branches is usually but not always continued down into that in the centre of the main stalk. At least a foot in length of the pith appears to be required to support one of these worms and bring it to maturity. They are particularly fond of the younger and more tender stalks, and these being small have their whole interior ate away almost or quite out to the bark, so that they resemble hollow straws or sticks that have been consumed by white ants so that merely an outer shell remains. And not unfrequently a portion of the upper end of the stalk is broken off, from being so much weakened. The worm hereupon essays to plug up the opening thus made, with its sawdust-like chips, to prevent rain from entering its cell and to exclude spiders and other enemies. Sometimes a greater number of worms are placed

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in a particular stalk than can be accommodated in the pith. In this case some of them resort to the soft outermost layers of the wood immediately beneath the bark, where broad shallow burrows stuffed with the castings of the worm will be met with, occasionally with the worm lying in them. I have in one instance found twelve worms in the different parts of a single stalk.

When the worm has completed its growth and is about to leave off feeding it gnaws a small orifice out to the bark through the wooden wall by which it is surrounded, in order that when it has changed to a beetle it can make its exit from its prison by merely rupturing the bark. The hole thus made is then stuffed full of little chips to protect the bark from being prematurely broken. It then withdraws itself down the stalk slightly below this hole, and constructs a bed on which to repose during the long period of inactivity that now follows. This bed is formed of short woody fibres wadded together and filling the cavity for the length of about half an inch. A similar mass is commonly placed above the worm also, formed mostly of finer materials like sawdust intermingled with brown and white grains, the castings of the worms. The space between these two partitions is about half an inch in length and forms the chamber in which the worm reposes until it changes to a beetle. In the Entomological Museum at the Agricultural Rooms is a currant stalk showing the burrow of this insect, with one of the worms lying in its cell, having a slip of transparent mica cemented over it, and also showing slightly above it the orifice which this worm had cut through the wood whereby to make its exit.

It is about the first of June that the parent insect deposits her eggs upon the currant stalks, and the worms get their growth by the close of the season. They repose in their cells through the winter, changing to pupæ with the warmth of the following spring, and begin to appear abroad in their perfect state as early as the middle of May, the sexes pairing immediately after they come out.

Although the larvæ of this insect are now found in such abundance in the stalks of the cultivated currant in our gardens, before this shrub was introduced upon this continent it doubtless sustained itself upon the wild currant. And it probably is not limit-

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ed to this genus or plants but feeds also upon several other small shrubs growing in our fields and forests, the stalks of which have a texture similar to that of the currant. I infer this from the first pair of these insects which I met with, twenty-five years ago, occurring upon the small-flowered honeysuckle (*Lonicera parviflora*) near which no currant bushes were growing.

The LARVA of this insect is nearly or quite 0.30 long and about 0.07 in diameter, cylindrical and divided into thirteen segments by deep wide transverse constrictions, the last segment being narrower and more or less retracted into the one which precedes it. The head is scarcely half as broad as the body, short and wide, flattened, dark chestnut brown with the base whitish and with short stout triangular black jaws. The second segment or first ring is pale tawny yellow above on its anterior part, the rest of this ring and all the remaining segments being white, rarely straw yellow, shining, soft and flesh-like. It is wholly destitute of feet. To compensate for this deficiency the worm upon the back and beneath is furnished with a cluster of small round tubercles or elevated dots forming an oval spot upon the middle of each segment, whereby it is aided no doubt in clinging to the walls of its burrow as it moves about therein. The breathing pores form a row of cinnamon brown dots along each side. The body is slightly clothed with very fine short hairs, which on the last segment are more numerous and rather longer.

The BEETLE is 0.18 to 0.23 long, the thorax almost as wide as the wing covers and nearly as broad as it is long, with its sides convex. The head and thorax are covered with small deep confluent punctures, those upon the wing covers are much more coarse and are deep and confluent except on the tips where they become smaller and slightly separated. The wing covers have a broad round elevated spot or tubercle at their base, and a narrower hump upon the shoulder. Its color is black with the margins of the wing covers and thorax pale chestnut brown. The wing covers have a large milk-white spot beyond their middle, which is transverse, crescent-shaped with the convex side forward, the inner end slightly separated from the suture and the outer end often reaching to the outer margin; and forward of their middle are two small spots which are sometimes buff yellow, sometimes ash-gray, the forward spot being a short oblique line placed nearer to the suture than to the outer margin, the other spot being a small dot which is often oblong, situated back of the inner end of the first and nearly as far from it as from the suture. All these spots are formed by very short hairs or more properly scales, which are appressed to the surface and in old individuals become rubbed so that the forward spots are more obscure or partially obliterated. The scutel is ash-gray from similar scales. The antennæ are pale chestnut brown, commonly with a darker brown or blackish band on the thickened apex of each joint, and they are thickly covered with short fine incumbent ash-gray hairs which in a particular reflection of the light give a gray color to the basal portion of the longest joints. They are shorter than the body, thread-like, their first joint thickest, long and tapering to its base, their second joint short, but little longer

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than broad, and shaped like a reversed cone, the two succeeding joints longest of all, the fifth one much shorter and all the following ones shorter still, the last one being pointed at its tip. The under side is black with small punctures which are close and somewhat confluent, and the surface is thinly covered with short incumbent gray hairs. The legs have similar hairs and are pale chestnut with the thickened part of the thighs black and sometimes the tips of the shanks also, the forward shanks presenting a slight wide transverse concavity on their insides.

Variety *a*. Color chestnut brown throughout.

In the cavity in the interior of diseased currant stalks, I have met with a small mite, which is described on one of the following pages, and also with two kinds of larvæ in addition to those of the currant borer. One of these larvæ lies naked among the chips made by the borer, and is scarcely 0.10 long, white, glassy, without feet, tapering to a point at one end, which point is thrust out and retracted at the pleasure of the worm and shows two blackish parallel lines upon one side. I have not yet succeeded in obtaining these in their perfect state, but they are evidently the maggot of some small two-winged fly, which is not a parasite upon the borer, for the remains of no dead worm are seen near them. Their further habits and economy still remain to be traced out.

The other worms are parasites, several of which live together in the body of the borer till they get their growth, by which time they have consumed all the internal parts of their foster-parent so that only the outer skin remains. They then crawl from this skin and spin their cocoons at short distances one above another in the cell. Their cocoons are 0.20 long and of sufficient width to fill the cavity where they are placed. They are thin and almost transparent, appearing like a fine membranous substance through which the worm within can plainly be seen. After finishing their cocoons they cast their skins, which form a little black mass in the upper end of the cocoon. The worms as found in these cocoons in the winter season are 0.13 long by 0.06 in width, white, shining, soft and of a flesh-like substance, their form elliptic but curved into the shape of a crescent, the sutures marked by transverse lines slightly constricted, with a very fine pale brown transverse line placed at the mouth. These worms change to pupæ in the spring and give out the perfect insect the fore part of June. They thus come abroad about three weeks after the borers have come out, so that by the time they are ready to deposit their

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eggs the larvæ of the borer will be grown to a sufficient size to meet their wants. For with such forethought and skill has Omniscience appointed the times and seasons of every creature, that each little insect comes into existence upon the very day that its food is in readiness and everything is matured for it to fulfill its allotted work in the economy of nature.

This parasite of the currant borer is a small four-winged fly pertaining to the order *Hymenoptera* the family *Ichneumonidæ* and the sub-family *Braconides*. It is 0.10 long, black, the first joints of its antennæ and its feelers and legs deep honey-yellow, its mouth, fore-breast and the two first segments of the abdomen darker yellow with a black spot on the first of these segments, and with a yellowish cloud upon the middle of the third segment, the under side of the abdomen being black-brown. Its ovipositor resembles a small bristle and is about a third of the length of the abdomen. It is probable that as this insect walks up and down upon a currant stalk with its antennæ applied to the surface and rapidly vibrating, the sense of feeling possessed by these organs is of such exquisite delicacy that it is able to detect the very spot where a small worm is lying in the centre of the stalk, and that it then insinuates its ovipositor through the bark and wood and punctures the skin of the worm, inserting therein as many eggs as the borer will be able to sustain.

I have attached the name *Cenocælius? Ribis* to this insect in my cabinet. The prædiscoidal cell of the fore wings occupies but two-thirds of the length of the oblique vein which bounds its anterior side, the first submarginal cell occupying the remainder of this vein, thus separating the prædiscoidal cell widely from the costa. This induces me to refer this insect to the genus *Cenocælius* of Westwood's Synopsis, though I am by no means certain that it is congeneric with the undescribed species named as the type of that genus. The feelers are very slender and elongated, the maxillaries being longer than the head and about equal in length to the anterior thighs. The head is nearly as long as broad and sub-globular. The antennæ are slender and almost as long as the body. The abdomen is obovate or nearly oval, slightly depressed, equaling the thorax in length and exceeding it in width.

It should be observed before leaving this subject, that I am uncertain whether this insect is the destroyer of the American or of the European currant borer. Though there were several of the American borers in the currant stalk in which I met with

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them, the shrivelled remains of the worm from which these parasites came gave indications of its having been a Lepidopterous rather than a Coleopterous larva. Five of these parasitic worms had come from it, but of this number three were so weak and immature that they died without forming their cocoons.

We have only to state in conclusion, that the utter carelessness with which the currant is treated in most of our gardens, with a thicket of young shoots annually left unpruned and crowding upon and smothering each other, gives these borers and other pernicious insects the utmost facilities for lurking unmolested and pursuing their devastating work without interruption. Were this shrub suitably trimmed and kept thinned out to only three or four stalks from each root these stalks growing freely exposed to the light and air would be little if any infested by these depredating insects.

As these worms remain in the dead stalks through the winter their destruction is easily effected. By breaking off all the dead brittle stalks at the surface of the ground and burning them these borers may at once be exterminated from the garden. But they will soon find their way back again unless the bushes are well pruned every year.

135. EUROPEAN CURRANT BORER, *Trochilium Tipuliforme* Linn. (Lepidoptera. Trochiliidæ.)

Feeding upon the pith of currant stalks causing them to perish, a small whitish worm with a darker line along the middle of its back and a brown head and legs; changing to a pupa within the stalks, and the fore part of June giving out the perfect insect, which is a small moth having some resemblance to a wasp, its wings being clear and glassy, the fore pair opake yellowish at their tips, with a black margin and band near the middle, and the abdomen black with three yellow bands situated one upon each alternate segment. Width 0.65 to 0.85.

This insect, to which the common names of Currant hawk-moth and Currant clear-wing are given in English works will be more readily known in this country by the name which we have appended to it. A short history of it is given in Dr. Harris's Treatise, p. 255, under the name *Ægeria Tipuliformis*. The reason

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why the name *Trochilium* is now given to this genus, instead of *Ægeria*, has already been stated in connection with the Peach tree borer, No. 59. The name *Trochilium* means a little humming-bird, being a diminutive of *Trochilus*, the technical name of that genus of birds, and its appropriateness will at once be perceived by every one who has noticed one of these insects or their kindred of the Sphinx family hovering over flowers, the larger species having often been mistaken for humming birds.

136. WILD CURRANT BORER, *Trochilium caudatum*, Harris.

A worm similar to the preceding, boring in the stalks of the wild black currant (*Ribes floridum*) and producing a brown moth with tawny yellow neck, feet, antennæ and tail, which last in the males is nearly as long as the body. Width 1.00 to 1.25. See Silliman's Journal, vol. xxxvi, p. 311.

137. CURRANT MITE, *Tyroglyphus Ribis*, new species. (Aptera. Acaridæ.)

On diseased currant stalks, in the cavities which have been excavated by borers and under the loose bark, a minute mite scarcely the hundredth of an inch long and less than half as broad, white, shining, its head about half as broad as the body, the head and thorax forming a third of its total length.

Being met with sometimes in excessive numbers in those currant stalks which have been killed by borers, this minute creature merits a notice in connection with them, though we know not whether it should be ranked as an injurious species. Several of the insects of this family are known to be pernicious to the vegetation and the living animals which they infest. But our knowledge of their habits and economy is still so limited and imperfect that it is uncertain whether a large part of them are to be regarded as noxious or innocent. Many of them like the present species appear to be present in the situations where we find them in consequence of disease and decay already existing, and not as the cause of maladies in connection with which they occur. It is also probable that very many if not most of the species of mites which we have upon this side of the Atlantic are identical with those of Europe. One of the evidences of this is now fresh in my mind, and possesses sufficient interest to be stated in this

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place. A few years since I made a partial investigation of the insects which occur in diseased potatos. Among these I met with excessive numbers of mites, mostly pertaining to two different species. Within a few days past having received from M. Guerin Meneville his paper upon this same subject, published in the Bulletins of the Royal and Central Society of Agriculture, I observed that two species of mites were here described and figured. On comparing these figures with the sketches which I had heretofore taken, their coincidence was apparent on a moment's glance, rendering it evident that these two little creatures which resided in myriads in my own cellar were identical with those found in the same situation in the distant city of Paris.

The mite which occurs in diseased currant stalks, appears to be unlike anything which I find mentioned by authors. It has a considerable resemblance to the longer mite (*Tyroglyphus longior*, Gervais) which has been discovered in company with the cheese mite in the rind of old cheese, but the head here is much larger and the thorax longer, so that the abdomen forms but two-thirds of the length of the insect. A slight but very distinct constriction separates the thorax from the abdomen and a more slight one divides the head from the thorax. The head is shaped like an egg and from its anterior end two small very short bristles project forward like little horns. Two longish bristles project backward from the tip of the abdomen, and there are two shorter ones upon each side of these and another standing directly outward upon each side of the abdomen towards its base. The legs are of equal length, rather slender and cylindric, each having near the tip a longish bristle standing outward. When walking the four hind legs are wholly hid as the insect is viewed from above.

Many hundreds of these mites may sometimes be met with in their winter quarters, heaped together in a mass in the lower end of the cavity which has been excavated by a borer. On bringing them into a warm room they immediately awake to life, all moving their legs but showing no disposition to separate and crawl away.

138. AMPUTATING BROCADE MOTH, *Hadena amputatrix*, new species. (Lepidoptera. Noctuidæ.)

The latter part of May, severing by night the young succulent stalks of currants, roses, &c., a cut-worm 1.50 long, of a brownish

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CURRANT. STALKS.

or livid color, shining, with a chestnut-colored head and a horny spot of the same hue on top of the neck and of the last segment, and with faint dots symmetrically arranged, each yielding a very fine short hair. Burying itself about a month, the moth coming out in July, its fore wings rusty red clouded with gray and blackish, with the usual round and kidney-shaped spots near their centre large, pale gray or white, and beyond these spots a broad bluish-gray band parallel with the hind margin and not reaching the outer edge, this band margined on its hind side by tawny yellow followed by a wavy white line extending across the wing and ending outwardly in a large gray spot which occupies the tip. Colors and marks sometimes dull and obscure, sometimes bright and distinct. Width 1.80.

This is one of our most common night-flying moths. Having been found arranged with British species in some old English collections it was supposed to be a native of that country and was described as such by Mr. Stephens, who conjectured it to be the species named *amica* by Treitscke. Now that it is so evident that this was an error it is improper to continue using this name for this species, and I therefore propose for it a new one having reference to the habits of the larva, this being the first characteristic which comes into the mind, commonly, when this insect is thought of. By this insect in addition to the borers above mentioned Nature endeavors to lop off all that redundancy of stalks which the roots of the currant produce and which man neglects to remove. See Harris's Treatise, p. 350.

Apple bark louse, No. 15. I have occasionally seen the bank of both the garden and the wild currant crowded with these minute oyster-shaped scales, the stalks being commonly dead in consequence of their attack. A currant stalk thus excessively over-run may be seen in the Entomological Museum of the Society.

139. Circular bark louse, *Aspidiotus circularis*, new species. (Homoptera. Coccidæ.

On the bark of currant stalks in gardens of the city of Albany, early in the spring, I have observed a minute circular flat scale, only 0.03 in diameter, similar to a species named *Aspidiotus Nerii* but differently colored, being of the same blackish brown hue with the surrounding bark and having in the centre a smooth round wart-like elevation of a pale yellow color.

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CURRANT. LEAVES.

140. CURRANT BARK LOUSE, *Lecanium Ribis*, new species. (Homoptera. Coccidæ.)

A hemispherical scale of a brownish yellow color, about 0.30 in diameter, adhering to the bark of the garden currant, its margin finely wrinkled transversely; often perforated with one, two or three holes, from which have issued minute brilliant green four-winged flies which in their larva state have fed upon and consumed the minute eggs which originally existed under these scales. This is quite common in some gardens, and I suspect has been introduced into this country with the currant, although European authors have made no mention of a scale insect as belonging either to this shrub or the gooseberry. It will be most readily found before the leaves put forth in the spring.

AFFECTING THE LEAVES.

141 AMERICAN CURRANT MOTH, *Abraxas? Ribearia*. Fitch. (Lepidoptera Geometridæ.)

About the middle of June, eating the leaves of the currant and gooseberry, in some gardens stripping the bushes entirely naked; a cylindrical ten-footed measure worm nearly an inch long, bright yellow varied on each side with white and with numerous black spots and large round dots regularly arranged, each giving out a fine black bristle, burying itself slightly and changing to a pupa without forming any cocoon; the moth coming out therefrom about the first of July, of a pale nankin yellow color, the wings with one or more faint dusky spots behind their middle in the male and in the female with an irregular band crossing both pairs. Width 1.30 to 1.45.

This is the most remarkable depredating insect which we have upon the currant in this country. It was fully figured and described in the Transactions of this Society ten years ago (vol. vii, p. 461), at which time it was much more numerous within the sphere of my observation than it has since been, although scarcely a year has passed but that some gardens might be seen with their currant bushes nearly or quite defoliated by it. It has been more numerous the present year (1857) than for several years before, and I learn from Rev. Wm. C. Reichel that in

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CURRANT. LEAVES.

Eastern Pennsylvania this same insect has this year totally consumed the currant leaves in several gardens. A letter from Lorenzo Rouse of Paris Hill, Oneida county, enclosing some of these worms in a vial of spirits and soliciting information respecting them, states that they were first noticed in that vicinity three years ago, and that they have continued to increase since that time, stripping the leaves from the gooseberries first and then from the currants. Our wild gooseberry (*Ribes Cynsobati*) was probably the original habitat of this insect, for I have noticed the moth around that bush, growing in the angles of fences, in years when none were observed in gardens; and perhaps one of these bushes set in an infested garden would allure most of these insects to it and render their destruction more easy than when they are scattered. Where these insects once establish themselves they there remain. The same gardens in my neighborhood which were most severely ravaged by them ten and twelve years ago are the ones in which they have been most numerous the present year, notwithstanding that in some of the intervening years these gardens have appeared to be nearly or quite free from them.

Mr. Rouse states that he has applied lime, ashes, soot, snuff, tobacco water and whale oil soap suds to his bushes, but all to no purpose. Shaking the bushes and picking the worms off by hand and destroying them is probably the only effectual mode of exterminating them, as I have heretofore said. Choice varieties of the gooseberry and currant may be securely protected by wholly enclosing each bush in netting made of the cheap fabric used for musketo bars, or some similar material, every worm upon these bushes being previously dislodged.

142. PROGNE BUTTERFLY, *Vanessa* (*Grapta*) *Progne*, Fab. (Lepidoptera. Nymphalidæ.)

Eating the leaves the latter part of June, a gray worm 1.25 long with a white head and branching white prickles, their points black; the pupa hanging with its head downwards from the under side of a limb about twelve days and the fore part of July giving out a butterfly with scalloped wings, the hind pair black shaded into tawny yellow at their base where is two black dots, their under sides with a central silvery straight mark bent to an obtuse angle somewhat resembling the letter L. Width about 2.00.

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CURRANT. LEAVES.

So long ago as the year 1781 Fabricius (Species Ins. ii, 93) described one of our American butterflies under the name *Progne*, this, in the fables of heathen mythology, being the name of a sister of Philomela who was said to have been changed into a swallow. The deeply notched wings of this butterfly, having some resemblance to the forked tail of a swallow, perhaps suggested this name to Fabricius. Figures and descriptions of this butterfly given by different authors since, have made it well known; but to this day we have remained unacquainted with the vegetation on which it is reared and the caterpillar from which it comes. In June last, two worms were sent me from J. M. Stevenson of Cambridge, one of the Vice Presidents of the State Agricultural Society, found with several others of the same kind feeding upon the leaves of his currant bushes. They proved to be the larvæ of the Progne butterfly, and I am thus able to give the complete history of this species. I have also met with this butterfly in thickets bordering on lowland meadows, where it had probably been reared upon the wild black currant growing plentifully in these situations. A caterpillar found upon elms is described by Dr. Harris as being the larva either of this species or of the Comma butterfly (*C-album=comma*, Harris.) It now appears beyond a doubt that it pertains to this latter species and not to the Progne butterfly under which it is placed. As the Progne is so intimately related to the Comma or White-C butterfly, and as this species feeds upon quite a variety of trees and plants, it is probable that further researches will show that the Progne is not restricted to the currant but subsists upon other kinds of vegetation also.

In very many of its marks no sensible difference exists between this butterfly and the White-C, and the collector who has but one of these species in his hands will be much perplexed to determine which of these names to give to his specimens, with only such brief and imperfect accounts as authors have commonly given to guide him. An exact description of each particular part of an insect is a valuable aid to the student in his researches, in every instance, and is specially required where different species are closely related. I have therefore endeavored to draw up such a description of this butterfly in its different stages as will serve to

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distinctly point it out hereafter to every one into whose hands it may come.

The larva is gray with two or three deep transverse wrinkles at each suture, the bottoms of which wrinkles are black and their summits whitish. On the fore part of each of the abdominal segments is a whitish band which on each side is interrupted by two oblique black spots. Each of these segments also has a pale tawny yellow spot above the breathing pore and a smaller one below it, with prickles placed in each of these spots. The head is white with black dots, and is very rough from numerous short white spines of different sizes, and placed upon its summit are two black prickles with numerous branches which are mostly white with black tips. The two upper prickles upon the second ring are also black like those upon the head, those upon all the other segments are white, mostly with black tips, their branches white, towards the forward end of the body becoming tipped with black more and more. The first ring or neck is destitute of long branching prickles and has only a belt of short spines around its middle, similar to those covering the head. A few similar spines also occur upon the sides of the following segments and on the outer face of the pro-legs. The legs and pro-legs are dull pale reddish, their outer sides black. The mouth is dull reddish and the under side of the body white mottled with brownish dots and short lines.

From this description it will be seen that in its larva as in its perfect state this species is intimately related to the White-C. The Progne however has but one brood each year, the butterflies appearing in the month of July. The two larvæ which were sent me were found on the morning of June 29th to have cast their skins and assumed their pupa form the preceding night, one of them suspending itself from the stalk of a leaf, the other attaching itself to the side of the net in which they were inclosed. And on the morning of July 11th both were found changed to butterflies, the pupa state thus lasting but twelve days. Dr. Harris reports having obtained a Progne butterfly so late as the eighteenth of August, its pupa state having continued but eleven days. The few instances in which I have met with this butterfly have all been in the month of July.

The PUPA is 0.80 long and of a gray color with obscure olive clouds. It has a deep excavation across the middle of its back in which on each side of the middle is a burnished silvery-golden spot and outside of these spots is a blackish streak at the margin of the wing-sheaths. On the opposite side of the body and above this excavation is another similar excavation, at the base of the venter and tips of the antennæ-sheaths—these excavations giving to the pupa a very humped and deformed appearance A broad dusky olive stripe in which

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the breathing pores are placed, extends along each side of the abdomen and is edged on its front side with a narrow white stripe, and on its opposite side is an elevated black point upon each segment. Along the middle of the back is a whitish stripe which becomes double towards its lower end, and on each side of this is a dull olive spot on each segment with an obtuse elevated point outside of each spot. The lower end or head is deeply notched so as to form a somewhat conical point on each side, resembling a pair of horns.

The BUTTERFLY measures across the spread wings from 1.90 to 2.30. Its *fore wings* are of a bright tawny orange color, sometimes paler tawny towards their tips or over their whole surface. Their hind border is black, commouly freckled with yellow or gray scales on its outer half. Along the forward edge of this black border is a row of seven faint crescent-shaped spots of a paler yellow color than the ground, the second one from the inner margin largest, and those next to the outermost one oval rather than crescent-shaped and commonly with a black dot more or less distinct, placed upon their forward ends. Forward of these pale crescents is a dark rust-red spot upon the inner and a larger one upon the outer margin. A large somewhat square black spot is placed forward of this last one, upon the apex of the discoidal cell, which spot becomes dark rust-red towards its outer end and sometimes does not reach the outer edge of the wing. Upon the disk are five smaller round black spots, the three forward ones in a transverse row, of which the two outer ones are placed in the discoidal cell and nearer to each other and are often smaller and deeper black than the other three, which form a longitudinal row inside of and parallel with the middle vein. The outer margin and hind part of the inner margin is black irregularly alternated with grayish white. At its base the outer margin is strongly contracted or obliquely excavated instead of being straight or merely rounded inward as in other species. The hind margin is irregularly scalloped or wavy along its edge, with a more or less deep rounded excavation in the middle, at the outer end of which is a projecting prominent angle which is commonly acute. The fringe is black with whitish alternations between the projecting teeth. The inner margin is also strongly excavated or arched. The *hind wings* are black gradually shaded into rusty-red across their middle and here often showing short transverse black lines, the basal portion tawny orange with a wide blackish margin and two round black spots, the inner one smaller and tapering anteriorly to a point. In the black ground forward of the hind margin is a row of pale yellow dots, those towards the inner margin more faint and often obliterated. The hind edge is scalloped and wavy, with a deep round excavation between the middle and the inner angle, on each side of which is a projection resembling a short tail which is rounded at its apex and of a bluish gray color. *Under side* dark gray with numerous irregular transverse streaks of black, dusky and brown, giving the surface a peculiar curdled appearance like that of the fabric called "chene cloth." The fore wings are crossed posteriorly with a broad paler gray irregular band, which is widened at its outer end into a large hoary white patch occupying the whole apex of the wing. In the centre of the hind wings is a silvery-white mark which is bent at an obtuse angle in its middle with the two ends straight. This mark is variable, being sometimes slender through its whole length, sometimes twice as thick at its

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CURRANT. LEAVES.

lower end as at its upper; its lower part is commonly shorter but is sometimes of the same length with the upper portion; the angle is sometimes but little obtuse, the mark then closely resembling the letter L; the concavity sometimes faces the hind margin near the outer angle of the wing, and sometimes opens towards the outer margin forward of this angle, this last variety being described as a distinct species under the name of *C-argenteum* by Mr. Kirby. An irregular wavy interrupted streak of brilliant green-blue scales extends across the hind wings forward of their hind border and is continued half way across the fore wings. This streak is irregularly margined with black and fades to faint green, and in some individuals can scarcely be discerned, especially upon the hind wings. The *body* is black with a brilliant green-blue reflection to the thorax and is clothed with tawny yellow hairs. The antennæ are black and alternated along their sides with white, and wholly white beneath, the knob being black and its tip straw yellow.

Though this butterfly has been met with from the latitude of Lake Winnipeg to the southern West India islands, and from the Atlantic to the Pacific coast, it does not anywhere appear to be numerous, and will probably seldom if ever occur in our gardens in such profusion as to do any appreciable injury. Indeed most persons will desire to cherish and protect these pretty "winged flowers," and domesticate them as much as possible in the yards around their dwellings, rather than to destroy and expel them. Although their larvæ covered with prickles have a repulsive aspect, they all disappear from the currant bushes before we have occasion to go near them to gather their fruit. Should these worms however become so numerous in any instance as to be detrimental, picking off each leaf on which they are stationed and crushing it beneath the foot will probably be found the only effectual mode of destroying them.

143. WHITE-C BUTTERFLY, *Vanessa* (*Grapta*) *C-album*, Linn.

Eating the leaves the fore part of August, a prickly worm very similar to the preceding, but of a brownish red color in front and white or pale yellow posteriorly, its pupa state continuing about sixteen days and the butterfly appearing in September, its wings scalloped, the hind pair tawny yellow shaded to dusky brown on their hind margin and with a black spot on their centre as well as two others towards their base, and on their under sides with a central sivery curved mark like a letter C. Width about 2.00.

Like the *Vanessa Antiopa*, *Atalanta* and several other butterflies, this species is common to both sides of the Atlantic. Dr. Harris

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regarded our American insect as different from the European, and accordingly named it *V. comma*. He supposed the wings to be more deeply scalloped or indented in the European than they are in the American butterfly and that the specimens of the two continents could at once be distinguished by this mark. But how perfectly fallacious this character is will appear from the remark of Mr. Westwood (Humphrey's British Butterflies, p. 50) who, in describing the European insect observes, "This species is subject to an extraordinary variation in the form of its wings. In some specimens the incision in the outer (posterior) margin of the fore wings is so deep that it forms nearly a semicircle, whilst in others it is scarcely more than a sextant; the other indentations being equally varied." Our American specimens vary in the same manner, the principal incision in the fore wings being much deeper than the sixth part of a circle in every instance which I have before me. And on comparing them on the one hand with the descriptions which European authors give of *C-album*, especially that of Mr. Westwood which is most detailed and clearly expressed, and on the other hand with the description which Dr. Harris gives of *comma*, every one must admit that, of the two, the former is plainly the species to which our insect pertains. In every particular they coincide most perfectly with the characters assigned to that species. And when in addition to this we recur to their habits, the larvæ subsisting upon the same kinds of vegetation and two broods coming out each year, not a peg remains on which to hang a doubt as to the identity of our American insect with that of Europe.

In England this has obtained the common name of the Comma butterfly, and Dr. Harris describes it as having a silvery comma beneath, upon the middle of the hind wings. But in each of the several examples which have come under my notice this mark very exactly resembles a letter C and not a comma. A translation of its technical name will therefore designate it more explicitly than the common name which we meet with in English books. In all its marks except those which we have specified above, it is nearly or quite identical with the Progne butterfly. The under side of its wings, however, are occupied only in places by transverse black streaks.

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CURRANT. LEAVES.

The larvæ have as yet been noticed in this country only upon the hop and the elm; but in addition to these it in England has been found feeding upon the nettle, gooseberry, currant, honeysuckle, hazle and willow, and will probably be found upon the same vegetation here. The hop appears to be the plant of which it is most fond.

Two broods of this butterfly come abroad each year, the one in May, and the other mostly in September. Degeer has remarked that it probably passes the winter in the perfect state, as specimens are observed in the first days of spring. I once met with it on the nineteenth of April, before warm weather had sufficiently advanced, it would seem, to have disclosed it from the pupa that season. And as the black Antiopa butterfly is occasionally met with torpid in its winter quarters, beneath a board or in the cavity of a decaying log and similar situations, where, though for months buried deeply under the snow, it will remain dry and in safety, to come abroad from its solitary cell upon the first warm days of spring, so it is quite probable some individuals of this species also, hatching from their pupæ late in autumn may go into winter quarters and reappear upon the wing early in the following spring. But these can only be regarded as exceptions to the general rule, for it is not till the beginning of May that we commonly meet with this butterfly. I have captured it much oftener than the preceding species, although it is probably no more common. It falls into the collector's hands more frequently, as it comes abroad twice in the season and makes its first appearance when there are but few insects to be gathered.

The CECROPIA EMPEROR MOTH No. 33, in its larva state a very large pale green worm with blue and yellow prickles, is occasionally found upon the currant eating the leaves.

The WHITE MILLER No. 125, its larva a large caterpillar covered with soft pale yellow hairs, feeds upon the currant leaves also.

144. PALE HISPA, *Uroplata pallida*, Say, (Coleoptera. Hispidæ.)

Blister-like spots upon the leaves, in which is a small tapering flattened worm, feeding upon the green pulpy substance of the

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leaf leaving the skin entire, producing a beetle which occurs upon the bushes in May and June, its wing covers of an oblong square form with elevated lines and intervening rough grooves, its color light yellow, black beneath and with the antennæ, the sides and two stripes on the thorax, and variable lines on the wing covers also black. Length 0.15. As I have commonly met with this beetle upon the wild black currant, I infer with considerable confidence that its larvæ subsist upon the leaves, mining them as the Rosy Hispa No. 37 does those of the apple.

145. CURRANT APHIS, *Aphis Ribis*, Linn. (Homoptera. Aphidæ.)

Irregular bulges or blister-like elevations of a brownish red color upon the leaves, opposite which on their under sides are corresponding hollows occupied by multitudes of plant lice sucking the juices of the leaf and sometimes covering the green succulent young shoots also; many of them without wings and of a pale yellowish color; others with clear glassy wings, and these mostly black with the abdomen light green and having a slightly protruded tail and black horns or honey tubes reaching about half way to the tip, with a row of deep green or black dots along each side forward of the horns, the antennæ and legs also black with the shanks and bases of the thighs pale, and with the third oblique vein of the wings obliterated at its commencement. Length 0.13 to the tips of the wings. More or less common in every garden, attended by ants and devoured by lady-birds (*Coccinellæ*) which are always seen on the same bushes, and which with other destroyers often wholly exterminate these lice so that only the bulged spots on the leaves remain to indicate their having been there.

146. OBLIQUE-STRIPED LEAF-HOPPER, *Erythroneura obliqua*, Say. (Homoptera. Tettigoniidæ.)

Puncturing the leaves and sucking their juices, a very small white leaf-hopper 0.12 long, its head and thorax with two bright blood-red or orange stripes and three short oblique ones on the wing covers, the outer one placed on the shoulder, the middle one on the disk and the inner one ending on the middle of the inner margin. This is common, particularly upon the bushes of the wild currant, but occurs on various other shrubs and trees

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throughout the year. Even in winter on turning over an old log one of these pretty little insects will sometimes leap into view from among the surrounding dead leaves. It is subject to considerable variations, the stripes being sometimes of a pale yellow color and one or another of them wanting. Commonly three black or dusky dots may be seen on the wing-covers in an oblique row forward of the membranous tips.

The COMPANION LEAF-HOPPER of the raspberry, the THREE-BANDED LEAF-HOPPER 105, and several other species of this group will also be met with upon currant bushes.

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11. THE GOOSEBERRY.—*Ribes Grossularia.*

Most of the insects which are found upon the currant are equally common upon the gooseberry, though the stalks of this shrub are so well defended by prickles that they are rarely if ever invaded by those borers which are so pernicious to the currant. In addition to the insects which are named under the currant, the following have been observed upon the gooseberry only.

147. GOOSEBERRY BARK-LOUSE, *Lecanium Cynosbati*, new species. (Homoptera. Coccidæ.)

On the stalks of the wild gooseberry (*R. Cynosbati*), a hemispheric, smooth, shining resin-brown scale, commonly freckled with dull yellow dots and with a dull yellow stripe along its middle. Length about 0.15. This is evidently a different species from that which we have found upon the currant.

148. MEALY FLATA, *Pæciloptera pruinosa*, Say. (Homoptera. Fulgoridæ.)

In July and August, puncturing and sucking the juices of the leaves and the young succulent shoots, a four-winged fly which is strongly compressed and wedge-shaped, its height almost double its width, of a dusky bluish color covered with white meal-like powder, its legs straw-yellow, and its wing-covers showing some faint white dots and near their base three or four dusky ones. Length about 0.30.

Ten years ago a gooseberry and pie-rhubarb growing contiguous to each other in the yard in rear of the old State Hall in Albany

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were thronged with this insect in the different stages of its growth. This is the northern-most point where it has yet been discovered. The preceding year the privet (*Ligustrum vulgare*) in gardens in the city of New-York was overrun with it, and a description of it was published in the New-York Farmer and Mechanic newspaper, of July 30, 1846, by Issachar Cozzens, under the name *Flata Ligustrum*, he being unaware that it had previously been named by Mr. Say. Further south it is quite common on various shrubs.

149. Gooseberry moth. (Lepidoptera. Tineidæ ?)

The fruit when about half grown perishing, its interior being ate out by a slender greenish worm about half an inch long with a dark colored nose, a dark band across the top of its neck, and the three forward pairs of feet of the same color, which forms a tube of silken threads from the cavity in the berry through a hole in its side to an adjacent leaf, through which it crawls out and in.

This is too interesting and important a depredator upon the gooseberry to be passed unnoticed, although I have not yet obtained it in its perfect state, it having generally completed its work and left the bushes before its destructive operations were observed. I have sometimes seen bushes of the wild gooseberry with every berry withered and reduced to a mere dry hollow shell with a cobweb-like tube protruding from the orifice in one side. And the present summer a letter to the Country Gentleman from E. Graves, jr. of Ashfield, Mass., states that for three years past, his "Houghton's seedling" gooseberries have been a total failure, from this same worm, as I am assured by the account which he gives of it and the specimens accompanying his letter.

150. Gooseberry midge, *Cecidomyia Grossulariæ*, Fitch. (Diptera. Tipulidæ.)

The berries turning red prematurely and becoming putrid, and having in them small bright yellow maggots of an oblong oval form and slightly divided into segments by fine impressed transverse lines; changing to pupæ in the berries and the latter part of July giving out a small two-winged fly resembling a musketo, of a beeswax-yellow color, its wings hyaline and slightly smoky, and its antennæ blackish and twelve jointed. Length 0.10. See Transactions, 1854, p. 880.

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12. THE HICKORY.—*Carya alba et al.*

The several species of hickory and walnut are all preyed upon alike by the same insects with a very few exceptions, and these trees suffer much more from their attacks than any of our other wild fruit trees. In the state of New-York are upwards of sixty insect depredaters belonging to these trees. Only a part of these, however, are yet known to us in their perfect state so that we are able to name and describe them.

AFFECTING THE TRUNK AND LIMBS.

151. TIGER CERAMBEX, *Goes tigrina*, Degeer. (Coleoptera. Cerambycidæ.)

Boring large holes lengthwise in the solid wood, a large cream-yellow grub, slightly tapering, with a faint darker line along the middle of its back, a black head chestnut-brown at its base, and the first ring flattened and pale tawny yellowish; changing to a pupa in the burrow it excavates (as do all other borers of the beetle kind), and producing a long-horned beetle of a brown color covered with incumbent short tawny gray pubescence, more dense on the wing covers, which have a broad dark brown band beyond their middle and another on their base. the thorax with an erect blunt spine on each side, and the antennæ pale yellowish with their first joint dark brown. Length about one inch. This is the common borer in all the hickory and walnut trees in my neighborhood. Those species of the old genus *Monohammus*, in which the feelers are blunt instead of pointed at their ends, have recently been set off into a distinct genus by Dr. Leconte, to which the name *Goes* is given. See Transactions, 1854, p. 850.

The annexed cut handsomely illustrates the principal operations of this insect; and those of the Apple-tree borer and other large borers belonging to the family Cerambycidæ are closely analogous to this. On the left hand side of the figure near its lower end is seen a small cavity which the parent beetle gnaws through the hard dead outer layers of the bark, and a small perforation through the soft new inner layers. Does the parent drop her egg in the bottom of the cavity which she gnaws, and does the young worm eat its way through the soft inner layers to the

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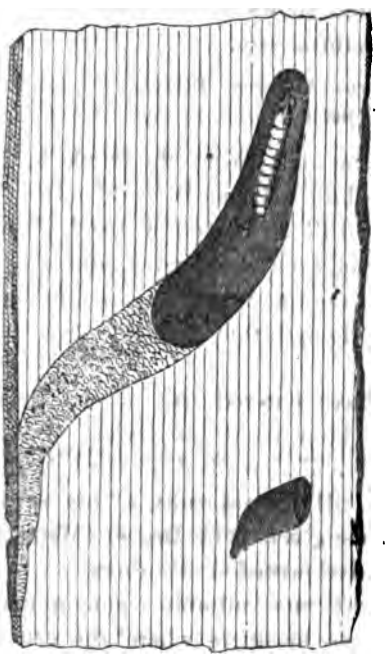
HICKORY TRUNK.



wood? or does she bore through these layers with her ovipositor and place her egg under the bark and upon the outer surface of the wood? The Apple-tree borer deposits her egg upon the outside of the bark, according to the observations of Esq. Baldwin, as related in my first report (Transactions, 1854, pp. 717, 718). But according to the statements of my esteemed fellow townsman, Wm. McKie, Esq., who has had the misfortune of having much experience with this insect, the results of which were communicated by him to the Horticulturist, published at Rochester, a few years since, the parent insect pierces through the bark and places her egg in contact with the wood. It is probably impossible to decide from an inspection of the perforation in the bark, whether it has been made by a minute worm which has gnawed its way through the bark, or has been pierced by the boring apparatus of the parent insect. It is only by seeing the egg in place before it is hatched, or by finding the infantile worm on its way through the bark that this point can be settled. The young worm lives at first upon the soft outer layers of the sap wood, mining a shallow cavity all around the orifice in the bark, and the bark dies and turns black as far as this burrow extends. Its jaws having at length become sufficiently strong, it gnaws its way into the solid wood from the upper part of its burrow under the bark, boring obliquely inward and upward, all the lower part of its burrow being commonly packed with its sawdust-like chips. Finally, having completed its growth, it extends the upper end of its burrow outward again to the bark, as shown in the cut heretofore given, Transactions, 1854, p. 851, which cut illustrates, on a diminished scale, the exit of this insect from the

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HICKORY. TRUNK.

tree, as the one herewith presented shows its entrance and the lower part of its burrow, of the natural size.

152. BELTED CERAMBYX, *Ceraphorus balteatus*, Degeer. (Coleoptera. Cerambycidæ.) [Plate 1, fig. 8.]

A worm similar to the preceding and boring the trunk in the same manner, producing a more flattened long-horned beetle of a dusky brown color with a short dull straw-yellow band placed obliquely forward of the middle of each wing cover, and with a small sharp spine on each side of the thorax and two slender ones on the tips of each wing cover. Length 0.60 to 1.10. See Harris's Treatise, p. 86.

All our American authors have entered this species under Drury's name *cinctus* or the still later name *garganicus* of Fabricius. Although it was figured and described in Drury's first volume, the name was not given till the appendix of his second volume was published. The name given it by Degeer (Memoirs, vol. v. p. 111) thus appears to have preceded all others.

It is difficult to decide upon the most suitable common name for many of our insects. In those instances where the generic name is long and difficult of pronunciation by persons not classically educated, and where this name cannot readily be translated, I have deemed it better to fall back upon the family name, thus following the example of recent English authorities in the smaller Lepidoptera and several other groups.

153. DISCOIDAL SAPERDA, *Saperda discoidea*, Fab. (Coleoptera. Cerambycidæ.)

A similar but much smaller worm than the foregoing, changing to a cylindrical long-horned beetle of a black or blackish-brown color, clothed with ash-gray pubescence which is less dense above and commonly forms three gray stripes upon the thorax and a band or crescent upon the middle of the wing covers, its legs being yellow or reddish. Length 0.40 to 0.60.

154. BANDED SAPERDA, *Oncideres cingulatus*, Say. (Coleoptera. Cerambycidæ.)

A worm similar to the preceding and producing a similar beetle but distinguished chiefly by having its wing covers sprinkled over with faint tawny yellow dots. Length about 0.60.

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HICKORY. TRUNK.

155. SLENDER-FOOTED DYSPHAGA, *Dysphaga tenuipes*, Haldeman. (Coleoptera. Cerambycidæ.)

Small grubs in the dead limbs and twigs, producing in May a small black long-horned beetle with rough wing covers but half as long as the abdomen and tinged with paler yellowish at their bases, its head having a furrow in the middle and its thorax cylindrical. Length 0.25.

156. LURID BUPRESTIS, *Dicerca lurida*, Fab. (Coleoptera. Buprestidæ.)

Mining shallow burrows in the sickly dying limbs, a long tapering yellowish white grub, its second ring very broad and strongly flattened, its head small and brownish, producing a blackish brassy snapping-beetle which may be found upon the trunk and limbs through the summer, its surface rather rough and with coarse punctures running into each other, its wing covers with raised lines on their inner part and two toothed at their tips, the end of the abdomen having three teeth and its under side being more brilliant brassy and with punctures opening backward. Length about 0.70. See Harris's Treatise, p. 43.

157. WALNUT ANT, *Formica Caryæ*, Fitch. (Hymenoptera. Formicidæ.)

Mining long narrow passages in the interior of the trunk and limbs and staining the adjacent wood light brown; a longish black shining ant, its abdomen with equidistant transverse rows of fine bristles, two rows upon each segment. Length 0.20 to 0.33. See Transactions, 1854, p. 855.

158. RED-SHOULDERED APATE, *Apate basillaris*, Say. (Coleoptera, Bostrichidæ.)

Boring small holes straight towards the heart of the tree, small fleshy white six-footed grubs with backs transversely wrinkled; changing to pupæ at the inner ends of their burrows, and producing small cylindrical black beetles covered with punctures, with the fore part of their thorax very rough and their wing covers with a tawny red or yellow spot on their base, their tips abruptly cut off obliquely, the margin of the declivity showing two or three little teeth on each side above and an elevated line below. Length 0.20 to 0.25. See Harris's Treatise, p. 81.

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HICKORY. BARK.

AFFECTING THE BARK.

159. FOUR-BRISTLED MITE, *Oribata quadripilis*, new species. (Aptera. Acaridæ.)

Under the loose scales of the bark, a broad oval mite of a shining resin-brown color and slightly transparent, with four small bristles projecting forward in front. Length 0.02.

Though our knowledge of the habits of this mite is very limited and we are not able to say whether it is an injurious species, it still merits a short notice in connection with the other insects which occur upon the bark of the hickory. The Hickory ant which has been mentioned above, in addition to occupying cavities in the interior of the tree is met with also under the loose scales of the bark, in which situation numbers of them may be found crowded together and torpid, in the winter season And associated with it a small mite will frequently be found, which appears to be closely related to the *Oribata bipilis*, described by Hermann from specimens discovered upon the bark of a tree in Germany. This mite is oval and about half as broad as long, somewhat depressed, polished and shining, of a resin-brown color and slightly transparent like resin. It has in front four projecting bristles of nearly equal length, the lower two curving inward, the other two straight, and a few bristles occur scattered over the body. The legs are also clothed with hairs of unequal length, and at the tip of each shank is a long bristle extending outward over and projecting beyond the feet. The four anterior thighs also have a shorter bristle at their tips, projecting outward parallel with those of the shanks. The four anterior legs are of equal length and somewhat longer than the hind ones, and the articulating part of their base is very narrow and slender. Their thighs are of an elongated ovate form, being strongly inflated into a kind of knot at their bases. In the winter season little groups of these mites are found clustered together in the crevices of the bark, torpid, but reviving when brought into a warm room and thereupon crawling about, though very slowly and awkwardly, the long bristles protruding out beyond the ends of its feet evidently serving to aid it in clinging to the surface over which it walks but at the same time impeding it from any briskness in its movements.

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HICKORY. BARK.

160. HICKORY BARK-LOUSE, *Lecanium Caryæ*, new species. (Homoptera. Coccidæ.)

Fixed to the bark of the small limbs, a large, very convex oval scale of a black color fading to chestnut-brown, in May dusted over with a white powder. Length often 0.40 by 0.25 in width.

161. HICKORY BLIGHT, *Eriosoma Caryæ*, new species. (Homoptera. Aphidæ.)

The under sides of the limbs particularly of bushes and young trees in shaded situations coated over with a white flocculent down, covering and concealing multitudes of woolly plant-lice which are crowded together upon the bark, sucking its juices; the winged individuals of a black color, with the head, scutel and abdomen covered with a white cotton-like substance, their wings somewhat hyaline, the forward pair with an oval salt-white spot or stigma towards the tip of their outer margin, their veins all very faintly traced or abortive. Length to the tip of the wings 0.12.

I have never noticed this blight in the state of New-York, though it no doubt occurs here. It was found common upon walnut bushes growing along Henderson river in Illinois, a few years since.

162. HICKORY APHIS, *Lachnus Caryæ*, Harris. (Homoptera. Aphidæ.)

In clusters on the under sides of the limbs in July and August and probably to the close of the season, puncturing the bark and extracting its juices, an unusually large plant-louse, 0.25 long and to the tips of its wings 0.40, its spread wings measuring 0.72, its body of a black color coated over with a bluish white powder like the bloom upon a plum, its antennæ reaching to the base of the abdomen, black and evenly bearded with shortish hairs, as are the legs also, the thighs being clear tawny red; wings hyaline, smoky at base and along the outer margin, their veins black, the rib vein and two first oblique veins very thick and margined with smoky, the third oblique vein and its two forks and the short fourth vein very slender. See Harris's Treatise, p. 208.

This species clearly pertains to the genus *Lachnus* as now restricted and admirably elucidated in the invaluable volume of Koch.

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HICKORY. LEAVES.

AFFECTING THE LEAVES.

1. *Forming galls and other excrescences.*

163.. HICKORY-STEM GALL-LOUSE, *Pemphigus Caryacaulis*, Fitch. (Homoptera. Aphidæ.)

Forming bullet-like galls, hollow, green and of a leathery texture, upon the leaf stalks and succulent young shoots, with the walls of the cavity inside covered with minute white and yellow lice; the perfect, winged insect not yet discovered; the gall subsequently turning black, opening and becoming cup-shaped. See Transactions, 1854, p. 859.

164. HICKORY-VEIN GALL-LOUSE, *Pemphigus? Caryæcena*, new species.

Forming plaits in the veins of the leaves, which project up from the surface in an abruptly elevated keel-like ridge upon the upper side of the leaf and with a mouth opening on the under side, the lips of which are woolly and closed.

Although the Aphis which produces these plans in the veins of hickory leaves is unknown to us in its winged state, its work will suffice to distinguish it from other species. The plaits occur mostly near the middle of the leaf, upon one side of the mid-vein, occupying the bases of the lateral veins, two or three of which are commonly enlarged into these excrescences or galls, which jut up in keel-like ridges from a quarter to a half inch in length. These ridges are of a pale yellow color, turning brown and becoming dry and dead after a time, and frequently before they perish the portion of the leaf between them withers and turns brown, in which case the inhabitants of the gall forsake it, being no longer able to obtain a due supply of nourishment from its walls. The lips of the mouth which opens on the under side of the leaf are covered with white or pale tawny yellow wool. They are pressed together, but a small orifice is open at their outer end, through which some of the young lice frequently crawl from the interior of the gall and station themselves upon the under surface of the leaf by the side of the mid-vein. The lips are readily drawn apart, exposing the cavity within, the walls of which are covered with minute wingless females and their eggs and young. The females are egg-shaped, broadest anteriorly and tapering behind to an acute but not an attenuated point. They are 0.03

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long, 0.02 broad, very pale yellow and at the tip watery white. The eyes appear like two minute brown dots widely separated, the head being short and broad with the transverse sutures between it and the other segments of the body very slight and indistinct. The legs and antennæ are short and tinged with dusky. The antennæ are three-jointed, the basal joint thickest and about as broad as long, the second joint globular and the third elongated and cylindrical, with a projecting point upon one side at the tip. When moving about the antennæ appear to be employed as a fourth pair of legs, their points being pressed to the surface over which it is passing, similarly to the feet. The eggs are small oval shining grains of a watery yellowish white color. The young larvæ are intermediate in size between the eggs and the females, and resemble the latter except that they are of an oval form and their beaks are proportionally longer reaching to or slightly beyond the tips of their bodies.

These excrescences are common upon hickory leaves throughout the summer season.

165. HICKORY THRIPS, *Phloeothrips Caryæ*, new species. (Homoptera. Thripidæ.)

Slender conical protuberances like the spur of a cock a quarter of an inch long, standing out perpendicularly from the under surface of the leaf and closed at their end, with a similar protuberance upon the opposite side of the leaf having its end open and split into several long slender teeth; within these galls a small slender shining black insect with the middle joints of its antennæ honey-yellow and its long narrow white wings appressed to its back.

Whether these singular galls, which resemble a long slender pod thrust half way through the leaf, are produced by the Thrips found in them, or by some other insect which forsakes them before this takes up its abode there, I am unable to say. In the instance in which I noticed them particularly, they occurred upon a young shag-bark hickory in the month of September. Quite a number of the leaves had one and several had two or more galls growing upon them, in each one of which was one or more of these insects or their larvæ. The galls were of a very tough leathery texture, green where they adjoined the leaf and deep purple at

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their ends, though most of them at that date had become dry and faded to a dark brown color. The leaf is often wrinkled around the gall and has more or less of a fold extending from thence to its outer edge. The insect within, when disturbed, turns its tail upward over its back in a menacing manner, the same as the rove beetles (*Staphylinidæ*) do; and when the point of a needle which has been pressed upon one of these insects is touched to the tip of the tongue, unless my imagination greatly deceives me, it will frequently be found to impart a peculiar acrid biting sensation. This insect is 0.07 long, of a deep black color and highly polished. Its head is narrower than the thorax and nearly square. The third, fourth and fifth joints of the antennæ are longer than the others, yellow and slightly transparent; the last joint is shortest and but half as thick as those which precede it. The abdomen is egg-shaped with its tip drawn out into a tube thrice as long as it is thick, with four long bristles at its end, and the abdomen is furnished with bristles at each of its sutures. The wings do not reach the tip of the abdomen. They are white and slightly transparent and fringed with black hairs. In its larva state it has a more slender linear form with a dull greenish yellow head, a white thorax with a broad black band anteriorly, a pale red abdomen with a black band at its tip, and whitish legs.

166. HICKORY LEAF WITHERER, *Phylloxera Caryæfolia*, new species. (Homoptera. Aphidæ.)

Forming small conical elevations on the upper surface of the leaf, each having an orifice in its summit; a very small black plant-louse with a pale abdomen and legs and smoky wings laid flat upon its back, and having only three veins in addition to the rib. Length 0.06.

The protuberances formed by this plant-louse are about 0.15 high and 0.20 broad at their bases, of a conical form and a dull red or lurid brown color surrounded by a light yellow ring which occupies the substance of the leaf for a short distance around the base of each cone. The apex of the cone is fimbriated or cleft into a number of small teeth which turn outwards, and in the centre between the bases of these teeth is a small orifice leading into a cavity inside of the cone, the walls of which are scarcely thicker than paper, but are very tough like leather. Some leaves

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have only one of these conical galls upon them, others have two, three or more. As many as a dozen may be found upon some leaves. And wandering about upon the surface of the leaf the mature winged flies will be found, which have crawled out from the gall in which they were nurtured, and in which multitudes of young lice in all the stages of their growth will be found crowded together and covering the walls of the cavity, with a few newly hatched winged individuals similar to those seen outside of the gall, but smaller and lighter colored, the whole of their body being pale yellow or with only a dusky band between the bases of their wings. As soon as they leave the gall, however, and expose themselves to the light and air, they change to a black color, the abdomen only remaining pale yellow often tinged with green. Some individuals may be observed in which the change in their colors is not fully completed, showing a pale yellow band upon their necks. Their legs are short and pale with black knees and feet. The antennæ are short, thick and thread-like, scarcely longer than the head, and with but three or four joints, difficult to discern. The wings are placed horizontally upon the back and not elevated as in most of the plant lice. They are smoky-transparent with a more dusky spot or stigma on the outer margin between the tip of the rib-vein and the outer edge, the rib-vein being perfectly straight and not curved as in other plant lice to give a greater width to this stigma-spot. In addition to the rib-vein the fore wings have only three oblique veins, all of which are straight and black. The first of these is placed forward of the middle of the wing and runs from the rib-vein to the inner margin. The last one runs from the stigma to the tip of the wing and is abortive or imperceptible at its base where it starts from the stigma. The middle vein is parallel with this last and starts from the first vein above its middle and reaches the inner margin equidistant from the tips of the other two, its base being abortive for a short distance. The hind wings form a very conspicuous angular point on the middle of their outer margin and have a longitudinal rib-vein but are wholly destitute of any oblique vein running from it to the inner margin.

From what has now been stated it will be seen that this small insect presents some notable peculiarities. We have a second species,

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belonging to the oak, which is perfectly congeneric with it. None of the figures in Koch's works correspond with these insects, and the genus to which they pertain is evidently unknown to him. But on gathering from different sources the details of the European plant-louse named *Quercus*, on which the genus *Phylloxera* has been founded by Fonscolomb, we find such a full coincidence as to assure us that our insects are congeneric with that species. We cannot but deem that the observation of M. Amyot (Ann. Soc. Ent. 2d series, v. p. 485), that in that species the three oblique veins arise directly from the outer margin of the wings, is inexact, as such a structure would be a perfect anomaly among the species of this family. Should that character, however, be as stated by M. Amyot, our insects would constitute a new genus, since in them the usual longitudinal rib-vein from which the oblique veins are given off is perfectly distinct.

2. *Puncturing the leaves and sucking their juices.*

167. HICKORY GAY-LOUSE, *Callipterus Caryellus*, Fitch. (Homoptera. Aphidæ.)

Scattered upon the under sides of the leaves, a small pale yellow plant-louse with white antennæ alternated with black rings, and pellucid wings laid flat upon its back, its abdomen egg-shaped, somewhat flattened and with only minute rudimentary honey tubes. Length 0.12. See Transactions, 1854, p. 869.

This and the four following species of very small delicate bright-colored plant-lice inhabiting hickory leaves were described in my First Report, at which time I remarked that they with other similar insects occurring on oaks and other trees formed a group so very distinct from the common species of the genus Aphis that they would probably be regarded as entitled to the rank of an independent genus. The same year in which that Report was published the portion of M. Koch's beautifully illustrated work (Die Pflanzenlause Aphiden) in which a few European species similar to these is given, made its appearance. These insects are therein formed into a new genus, to which the name *Callipterus*, i. e. beautiful winged, is given. And the European *C. Juglandicola* of Koch appears closely related to this present species, though sufficiently distinguished from it by the black

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rings upon the antennæ, which are always broad in our insect and are one of the first marks which the eye notices, but are represented as quite narrow and inconspicuous in the European. This is common upon hickory leaves; but the insects of this genus do not crowd themselves together and remain stationary like other plant lice.

168. DOTTED-WINGED GAY-LOUSE, *Callipterus punctatellus*, Fitch.

A plant-louse like the preceding, but with black feet and a black dot on the base and another on the apex of each of the veins of its fore wings. Length 0.12. See Transactions, 1854, p. 869.

169. SPOTTED-WINGED GAY-LOUSE, *Callipterus maculellus*, Fitch.

A plant-louse like the preceding, but with the veins of the fore wings margined in part with smoky and a black band near the tips of the hind thighs, the black rings upon the antennæ narrow. Length 0.12. See Transactions, 1854, p. 870.

170. SMOKY-WINGED GAY-LOUSE, *Callipterus fumipennellus*, Fitch.

A plant-louse similar to the preceding, of a dull yellow color with blackish feet and the wings smoky with coarse brown veins. Length 0.13. See Transactions, 1854, p. 870.

171. BLACK-MARGINED GAY-LOUSE, *Callipterus marginellus*, Fitch.

A plant-louse similar to No. 166 but with a black stripe along each side of the head and thorax, and on the outer margin of both pairs of wings. Length 0.15. See Transactions, 1854, p. 870.

172. FRECKLED LEAF-HOPPER, *Jassus irroratus*, Say. (Homoptera. Tettigoniidæ.)

A cylindric oblong white leaf-hopper closely inscribed and reticulated with slender black lines and small dots which form irregular spots along the margins of the wing covers, its legs white dotted with black. Length 0.25. Whilst several of its kindred draw their nourishment from grass and growing crops of grain this very common species is usually found upon the leaves of a variety of bushes, oftener upon those of the walnut and hickory than any other kind, according to my observations.

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173. FOUR-STRIPED LEAF-HOPPER, *Tettigonia quadrivittata*, Say. (Homoptera. Tettigoniidæ.)

A flattened oblong leaf-hopper of a light yellow color, varied on the thorax with orange, red or dusky, its wing covers olive green each with two bright red or orange stripes, the tips margined with black. Length 0.35. This pretty insect, like the preceding, occurs upon a variety of other bushes in addition to the walnut.

174. WALNUT SWORD-TAIL, *Uroxiphus Caryæ*, Fitch. (Homoptera. Membracidæ.)

A dull brown tree-hopper with the terminal portion of its wing covers obscure ash-gray, its abdomen and a ring on its shanks pale yellowish, and its breast mealy white. Length 0.30, the female 0.37. This is a somewhat common insect, which I have found only upon the walnut.

175. ONE-COLORED TREE-HOPPER, *Telamona unicolor*, Fitch. (Homoptera. Membracidæ.)

A tree-hopper of a uniform dull ochre yellow color and somewhat like a beechnut in shape and size, with a prominent hump jutting up on the middle of its back, highest anteriorly and descending with a slight curve to its hind angle which is very obtusely rounded and but little prominent, its anterior angle also rounded and with only a slight concavity below it at the forward end of the hump, whilst at its posterior base is a strong one, the whole surface with close coarse punctures and showing a few elevated longitudinal lines low down on each side and towards the tip; the upper edge of the hump black and also the tip of the abdomen on its under side; wing covers glassy with a black spot on their base and tip and their veins margined with slender black lines. Length 0.45, height 0.25. A variety (*irrorata*) occurs, of a paler grayish yellow color freckled with numerous pale green dots in the dried specimen. This is a rare species which I have only met with in a few instances, always finding it on walnut bushes.

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HICKORY. LEAVES.

176. BANDED TREE-HOPPER, *Telamona fasciata*, Fitch.

A tree-hopper resembling the preceding in its form, but smaller and of a tawny yellow color, its head and the anterior margin of the thorax and the under side paler cream-yellow or straw-colored with a single small black dot above each eye; its thorax in front and at tip blackish and also an oblique band across the hind end of the dorsal hump and a spot on the tips of the wing covers; the dorsal hump more long than high, longer at its base than above, highest anteriorly, with a stronger concavity at its anterior end than at its posterior and at its anterior base compressed and forming hereby a shallow indentation upon each side. Length 0.38, height 0.20. This is also a rare insect, and as in kindred species, the black colors are often partially or totally obliterated, except the black dot above each eye.

The V-MARKED TREE-HOPPER (*Smilia vau*, Say), an extremely common and variable species is sometimes met with upon walnut bushes, but belongs to the oak, on which it is always found in abundance.

177. SHORT-HORNED TREE-HOPPER, *Ceresa brevicornis*, new species. (Homoptera. Membracidæ.)

This is so similar to the common Buffalo tree-hopper No. 22, that it will scarcely be distinguished from it except by a practiced eye, although it is undoubtedly a distinct species. It differs from that in having the horns much more short, and the sides of the thorax when viewed in front are not gradually curved outwards but are straight or rectilinear with the horns abruptly projecting from the corner at the upper end of this line. The acute spine at the tip of the thorax is also more long and slender. The thorax between the horns is slightly convex. The dried specimen is of a pale dull yellow color freckled with faint pale green dots and with a paler straw-colored stripe, quite distinct, upon the angular sides of the thorax from each eye upward to the horn and from thence to the summit of the thorax. Length of the female 0.36. It was met with upon hickory bushes in New-Jersey.

178. FACE-BANDED CIXIUS, *Cixius cinctifrons*, new species. (Homoptera. Fulgoridæ.)

A small four-winged fly of a white color varied with blackish brown and with three elevated lines upon the face and thorax, its

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face snow-white crossed by two black bands, the outer raised lines dotted with white in these bands; the thorax black, tawny yellow on each side beyond the raised lines; neck white with a row of blackish dots upon each side; wing covers smoky-brown, their veins dotted with black in places, their basal edge, an oblique band and a spot on the middle of the outer margin white, their membranous tips white and somewhat hyaline, with a brown band across the transverse veinlets and the hind margin blackish interrupted by the snow-white tips of the veins; wings black and transparent; under side yellowish-white with two blackish bands on each of the four forward shanks. Length of the male 0.18. This was taken in company with the preceding, the middle of September. It may possibly be a variety of the *Flata nava* of Say, much more colored with black than in the specimens from which his description was drawn.

179. Cloudy-tipped Cixius, *Cixius colæpeum*, new species.

A small four-winged fly of a coal-black color with clear transparent wings having a large smoky-brown cloud on their tips; wing covers transparent, their veins dotted with black, the dots on the outer margin larger; an irregular and somewhat broken band of a smoky brown color extending across forward of the middle and a broader one beyond the middle, having a black spot or stigma on the anterior corner of its outer end; between these bands a smoky brown spot on the inner and a smaller one nearly opposite it on the outer margin; thorax with three raised lines; face black with the raised lines brown; legs dull whitish. Length 0.22. This also is a rare species.

Amyot's Otiocerus, No. 110. In each of the few instances in which I have met with this insect it has occurred upon walnut bushes.

The Large green tree bug No. 99, is a common species upon hickory as well as on several other trees.

3. *Eating the Leaves.*

180. Luna moth, *Actias Luna*, Linn. (Lepidoptera. Bombycidæ.)

In August, a large thick-bodied worm three inches long or more, of an apple-green color and its under side of a deeper or leaf-

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green hue, each segment with six small bright rose-red elevated dots, and low down along each side a pale yellow line running lengthwise immediately above the lower row of dots, from which line at each of the sutures a pale yellow line extends upwards upon the sides and sometimes is continued across the back, the head and six forward feet pale bluish green; spinning a whitish tough oval cocoon with rounded ends, 1.75 long, with leaves moulded to its outer surface; dropping to the ground in autumn and lying among the fallen leaves through the winter, giving out the moth the latter part of May; this of a delicate pea-green color, its body coated over with soft white wool, with a brick-red band across its anterior part and continued outward upon the forward edge of the fore wings nearly to their tips; each of the wings with a smallish eye-like spot near the centre, and the hind pair with their inner angles prolonged into tails which are nearly as long as the wings. Width 4.50 to 5.50.

It is a remarkable feature in the Insect Fauna of this country that we possess such a number of large showy moths of the group Attacus of Linnæus. Though the insects of the United States are generally so very similar to those of Europe and in some of the families are identical in many of their species, we here observe a notable difference. Whilst that continent furnishes only the three kinds of Peacock, the Tau and the rare Cæcigena, species of moderate size and but little diversified in their appearance, we have in the State of New-York alone eight of these elegant moths, nearly all of them vieing in size and magnificence with the most superb tropical products of this kind; and of a moiety of these the two sexes are so very dissimilar that in the cabinet they appear to form twelve distinct species. We have already presented some account of the Cecropia, No. 33, the Promethea, No. 80, and the Io, No. 81, and we here come to three others the larvæ of which occur upon the walnut.

Many persons on looking at these splendid insects in my collection have been much surprised on being informed that they were captured here in the State of New-York and that they are not rare species. They are very seldom seen, as they fly only by night and repose during the day time, clinging commonly to the sides of trees in groves and forests. This present species is less

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ornately adorned and diversified in its colors than the others. Its peculiarly delicate modest appearance causes many to rank it as "pre-eminent above all our moths in queenly beauty," and renders the name bestowed upon it by Linnæus most appropriate and happy, Luna being the Latin designation of the moon, the "queen of the night."

I have met with this feeding upon the beech as well as the walnut, and at the south it is also found upon the persimmon and the sweet gum. Varieties of the moth occur in which the fringe of the wings is wholly yellow or pale green, but commonly it is more or less of a rich purple or brownish red color along the middle of the hind edge of each wing. Some specimens have the margin of the hind wings sinuated or wavy from the tails to the outer angles. And another variety shows a darker streak more or less distinctly, forward of the hind border and running nearly parallel with it, at least upon the fore wings.

A Chinese species named *Selene* by Dr. Leach is almost identical with our Luna moth. So far as appears from a single specimen of this, sent me from Ningpo by Rev. M. S. Culbertson, the two insects can only be distinguished from each other by some of the minor details in the colors of the eye-like spots in the centre of their wings; varieties of the Luna occur which seem to coincide with the Selene in every other point.

The eye-like spots in these insects are situated upon the apex of the discoidal cell, and the transverse veinlet which bounds the outer end of this cell forms also the centre of the eye-like spot. In Selene this veinlet has only a slight narrow hyaline margin, whilst in Luna its margin is widened into an elliptic glassy spot; the eye thus appearing to be half opened in the latter and closed in the former. This central pupil is bordered on its forward or upper side by a rose-red crescent in both insects, the anterior or convex side of which is margined by an ochre-yellow line in Luna which is wholly wanting in Selene Finally, in both insects this spot is surmounted by a coal-black crescent accompanied by a white or bluish-white line, which is placed upon the concave margin of the crescent in Selene, but inside of this margin in Luna, so that a black line here borders it upon its hind or concave side. On the opposite or under side of the central pupil in Luna is a broader and paler rose-red crescent than that upon the upper side, sometimes faded to a white color, and this is succeeded by a still broader sulphur-yellow one, whilst in Selene we see only a broad white crescent faintly edged exteriorly with yellowish. And outside of this in Luna is a slender black line prolonged from the horns of the anterior black crescent and forming with it a circular ring surrounding this eye-like spot

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whilst in Selene no such ring occurs. The spot on the fore wings is much narrower and of an elliptic form, but has all the parts of that upon the hind wings. In Selene this spot appears to be more distant from the fore margin of the wing than it is in Luna, and is destitute of the brownish red streak which we see in Luna extending from the outer corner of this spot obliquely forward to the border of the wing.

181. POLYPHEMUS MOTH, *Hyalophora Polyphemus*, Fab. (Lepidoptera. Bombycidæ.)

In August and the fore part of September, a large thick-bodied worm closely resembling that of the foregoing species, 3.50 long and of an apple green color, not darker green beneath but having a pale yellow stripe along the middle on its under side, and on each segment six bright orange conical points, three on each side, with a sulphur yellow stripe from the lower to the middle one of these points, except on the anterior segments, and the upper points sometimes silvery on their outer sides; its head and six anterior feet of a clay-yellow color; crawling along the under sides of the limbs with its back downwards, its body being too heavy to be sustained in an upright posture; when at rest and contracted each segment strongly humped and forming an angular transverse ridge; constructing a cocoon in all respects like that of the Luna moth, which gives out the perfect insect the middle or latter part of May; this of a dull ochre or brownish yellow color with a glassy eye-like spot near the middle of each wing, crossed by a slender line and margined by a yellow succeeded by a black ring, which last is much broader on the hind wings and on its forward part is widened into a large cap-shaped spot as long as wide, with its concave end shaded into a bluish-white crescent; a dusky band faintly margined with white on its hind side crosses both wings forward of their hind margin, beyond which the ground color is commonly paler; anterior margin gray, which color is continued from the wings across the thorax in the form of a band. Width 5.00 to 6.50. A specimen in the collection of I. A. Lintner of Schoharie is much the smallest I have ever seen, measuring only four inches across its spread wings.

I have met with the larva of this insect on walnut, butternut, thorn and linden or basswood, and Dr. Harris (Treatise p. 298) records its occurrence on oaks and elms also. It sometimes attaches its cocoon partly to the side of a limb or sometimes with

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its silken threads draws two or three twigs together sufficiently to tie its cocoon between them, in which cases it does not fall to the earth with the fall of the leaves in autumn, but is very apt, by remaining exposed in the tree, to be perforated and have its inmate destroyed by woodpeckers.

It is remarkable that two insects which are so similar in their preparatory states that their larvæ differ only by slight and unimportant marks and their cocoons cannot be distinguished from each other still come to be so unlike each other in their perfect state as is the present species and Luna. The fact shows that the metamorphoses of the insects of this order is not so accurate a guide to their correct systematic arrangement as many have assumed it to be. This species having wings without tails and with glassy spots in their disk will pertain to Duncan's genus *Hyalophora*, but as the type of this genus (*Atlas*,) has the glassy spots large and angular, whereas here they are small, round and eye-like, it should probably form the type of a distinct genus.

The larvæ of this species and Luna are naked, except that fine hairs scarcely perceptible to the eye are scattered over the surface, at least upon the back, and one or two bristles are given out from each of the elevated dots. But I have met with larvæ upon the hornbeam and the butternut which I supposed to be the Luna, in which both when young and mature the surface was covered with numerous erect clavate scales, like short bristles gradually thickened towards their tips. Whether the moths from these larvæ are in any respect different from those which come from naked larvæ I hope to ascertain from specimens which are now in their pupa state.

182. REGAL HICKORY MOTH, *Ceratocampa regalis*, Fab. (Lepidoptera. Bombycidæ.)

In autumn, a very large apple-green worm, the largest larva in our country, measuring five or six inches in length and nearly an inch in thickness, with blue-black spots and rows of prickles and anteriorly several long orange-yellow horns tipped with black and studded with numerous black prickles, four of the upper ones longest, the head and feet also orange-yellow; lying under the ground in its pupa state through the winter, the moth coming

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out the beginning of July, of a bright red color with two yellow stripes on the thorax, its fore wings olive grayish or lead-colored with red stripes on the veins and light yellow oval spots mostly in a row parallel with the hind margin, the hind wings paler red with their anterior outer border and a large irregular triangular spot on their inner side light yellow. Width 5.00 to 6.00.

The larva of this splendid insect feeds upon the butternut and sumach as well as on the walnut and hickory, and at the south it is common upon the persimmon also. Its large size and long horns with branching prickles give it a truly formidable aspect, from whence it has acquired the name of "The horned devil" among the negroes at the south. It may be handled, however, without harm, as its prickles do not possess the power of stinging which belongs to those of the Io larva; and this frightful looking worm eventually becomes one of the largest, prettiest insects of our country. It is rarely met with in our State and only in its southern part. Some of its eggs sent in a letter from Philadelphia by Mr. George Newman enabled me to rear this insect and observe its transformations, and from these the specimen of the larva in the Entomological Museum of the Society was obtained. When reared in a colder climate than that to which it is native it is retarded beyond its usual period in completing its transformations, and thus its young do not have sufficient time to attain their growth before the season closes. It is therefore impossible to naturalize this elegant insect in the middle and northern parts of our State. The eggs sent me hatched mostly upon the 22d of July, and placed upon the sumach, the thriftiest one of the larva finished feeding and buried itself the 8th of September, but it was not till the 25th of the following July that the moth made its appearance. The pupa lies naked in the earth, without forming any cocoon. It is about two inches long and three-fourths of an inch in diameter, with rather deep transverse furrows at the sutures and wholly destitute of any rows of minute teeth. It has a small round elevation at its tip, like the head of a nail, and from the centre of this elevation two small blunt points project. It is of a bluish black color and the inside of the shell after the moth has left it is of a pale blue color and nacre-like, resembling the mother of pearl on the inner surface of a clam shell. When this moth

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first comes out it has a strong odor, exactly like that of opium, or the flowers of the poppy, and the pupa shell has the same smell also. It is common for the larger Lepidopterous insects when newly changed from their pupa state and before they take wing, to eject a few drops of an opake fluid, which is usually of a red color. In former times, before this fact was known, a whole brood of a particular species happening to come out on a single night in summer has so covered the leaves and grass with these drops over a wide extent of country as to lead to the confident belief that a shower of blood had fallen—a phenomenon which superstition would naturally regard as an omen of most alarming portent. The fluid emitted by the Regal hickory moth is of a milk-white color and of the consistence of thin paint, and it is more copious than in any other insect I have reared, a single individual ejecting over a table spoonful.

183. HICKORY TUSSOCK MOTH, *Lophocampa Caryæ*, Harris. (Lepidoptera. Arctiidæ.)

In July and August, eating the tender leaves at the tips of the limbs, companies of snow-white caterpillars with rows of large black dots, and along the top of their backs eight black tufts of converging hairs and two black pencils of longer hairs towards each end; growing to an inch and a half in length and in sheltered corners and crevices spinning ash-gray oval cocoons with rounded ends, which give out the moth the following June, this being a pale ochre-yellow miller, its fore wings with roundish white spots edged with tawny yellow rings, the hind ones often united together and forming two or three rows parallel with the hind margin. Width 1.70 to 2.10. See Transactions, 1854, p. 863.

This caterpillar has been unusually numerous the present year, 1857. It has been tenfold more abundant than it was two years ago when my account of it was drawn up. And it proves to be a more general feeder than has been hitherto supposed. Though it evidently prefers the walnut, butternut and sumach, it is common on the elm and ash also, and I have even met with clusters of these caterpillars upon the tamerack or larch. As they approach maturity they separate and stray off to other trees, and may then be seen on rose bushes, on the apple, oak, locust, &c., the same individual often remaining several days in one place.

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It is not till the latter part of September that they finally disappear from the leaves.

The FOREST CATERPILLAR, a species resembling the Apple-tree caterpillar, No. 28, but making its nest against the side of the trunk instead of in the forks of the limbs, occurs on the hickory, but is more common on the oak, under which the description of it will be given.

The FALL WEB-WORM No. 88, and the V-MARKED MEASURE WORM No. 39, are also common upon the hickory. A singular shaped worm named THE SKIFF by Dr. Harris (Treatise, p. 323) and several other species belonging to the genera *Limacodes*, *Notodonta*, *Lophocampa*, &c., which are not yet known to us in their perfect state, also inhabit the hickory.

Of insects in their perfect state eating the leaves of the hickory, the large GOLDSMITH BEETLE No. 57, is the only one which has yet been noticed.

AFFECTING THE FRUIT.

184. HICKORY-SHUCK MOTH, *Ephippophora Caryana*, new species. (Lepidoptera. Tortricidæ.)

A slender white sixteen-footed worm about three-eighths of an inch in length mining the shucks which envelope the fruit, causing the nuts to be abortive and many of them to fall from the tree prematurely.

There are few persons who have gathered hickory nuts but have noticed this worm in some of the shucks and the cells which it has excavated therein, filled with little grains of a tawny yellow color. A specimen of the moth which comes from these worms, and the pupa shell from which it issued, was sent me by Mr. Lewis Potter of Easton, N. Y., in April last, with a letter stating that the insect entered its pupa state about the first of February and the moth came out the last of that month. This doubtless refers to the fruit when stored within doors, for larvæ which are lying on the surface of the ground, torpid or congealed by the winter's cold, undergo no changes.

The shell of the chrysalis or pupa is of a pale dull yellow color and shows upon each segment of the abdomen two rows of

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minute teeth with their points curved backward, those of each anterior row being larger.

The specimen of the moth being somewhat mutilated does not enable me to be perfectly certain respecting the genus to which it pertains, though everything indicates it to be an *Ephippophora*, of which genus we have several undescribed species in the State of New-York, some of them quite common. It is of a sooty black color, its fore wings with reflections of tawny yellow, blue and purple, their outer margin black with oblique triangular whitish streaks placed at equal distances apart, these streaks gradually becoming more faint anteriorly and disappearing for a short space at the base, and all of them except the last three double or in pairs separated only by a slender black line. A very oblique faint silvery blue streak extends inwards from the points of two of these white streaks, namely, the fourth and sixth ones from the tip of the wing; and the usual white spot on the inner margin of the wings in this genus is wanting in the present species. Its hind wings are silvery whitish on their outer basal half, the scales of the inner basal portion having a blue and a gray reflection, and their fringe is bluish white. The face and fore breast is cream-yellow, the hind breast and base of the abdomen hoary white, the third and following segments of the abdomen coal-black. Width of the spread wings, 0.60.

Mr. Potter states that in his own neighborhood this insect had been common for a few years and became so numerous in 1856 that several of the hickory trees scarcely produced a single nut. The present year, 1857, all our native fruit trees have yielded an unusual abundance of fruit, and I have not been able to find one of these worms whereby to render this account of them more exact. It is quite probable that, like many of its kindred, this moth will be numerous at times, and will then suddenly disappear, being destroyed by parasitic enemies, by unfavorable seasons, or other causes. Picking up and burning the infested nuts is probably the only mode whereby we can diminish its numbers.

185. LONG-BEAKED NUT WEEVIL, *Balaninus nasicus*, Say. (Coleoptera. Curculionidæ.)

A weevil with its remarkably long slender beak drilling a hole in the nut when it is young and soft and placing an egg therein,

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HICKORY. FRUIT.

the worm from which feeds upon the meat and causes the fruit to fall, the worm finally boring out of the nut and burying itself in the ground to pass its pupa state, the beetle appearing in July and again the latter part of September, of a dark brown color coated over more or less with rusty whitish scales or short flat hairs, forming spots on the wing covers, which have punctured furrows, the thorax being black and densely punctured, the shanks chestnut-brown and the beak as long as the body and no thicker than a coarse bristle, polished and of a chestnut-brown color with a blackish tip, straight to its middle and from thence curved to its tip. Length 0.30 to 0.33 exclusive of its beak.

Worms seldom occur in hickory nuts in the State of New-York, but are common in them at the west. We meet with worms much more frequently in hazelnuts, chestnuts and acorns. A few attempts which I have made to rear some of these worms have been unsuccessful, nor was Dr. Harris any more fortunate in his efforts. Hence we are not certain as to the species which infest these respective fruits. Dr. Harris (Treatise, p. 65) states that he has met with this weevil upon hazelnut bushes. I have found another species similar to this upon the hazelnut, but have met with this species only upon the hickory at a distance of more than a mile from where any hazelnuts were growing. It appears probable, therefore, that this insect is not limited to one kind of nuts. The diseased hickory nuts show a small discolored spot upon their outer surface, and with a magnifying glass a round hole can be seen perforated in the centre of this spot, but closed up slightly within the nut. The meat inside is more or less eaten and the cavity thus made is filled with little brown and whitish grains, among which the worm is lying. It is a soft white grub, wholly destitute of feet, like the other larvæ of the weevil family.

The PLUM WEEVIL No. 70 is said by Mr. Say, on the authority of Wm. Bartram, to sometimes destroy the fruit of the walnut.

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13. THE BLACK WALNUT.—*Juglans nigra.*

The Locust-tree borer (*Clytus Robiniæ*) is a common borer in the trunks and limbs of the black walnut, and the beetles which are reared in this tree appear to constitute a distinct variety of a larger size than usual and with their yellow marks changed more or less to a white color.

186. Black-Walnut Sphinx, *Smerinthus Juglandis*, Abbot and Smith. (Lepidoptera. Sphingidæ.)

Eating the leaves, a large pale blue-green worm tapering in both directions from its middle and with a small head, a long horn at the end of its back and seven oblique white streaks along each side; when irritated making a creaking noise by rubbing the anterior joints of its body together; burying itself under ground through the winter and changing to a chestnut colored pupa with a rough granulated surface and six small tubercles upon its head; producing a narrow-winged moth of a drab gray, cinnamon-yellow or bluish lilac color, its fore wings crossed by four rusty brown lines, the two forward ones transverse the two hind ones parallel with the hind margin, and with a large square rusty brown spot on the middle of the inner margin between the two middle lines. Width 2.25 to 3.00. See Silliman's Journal xxxvi, p. 292.

14. THE BUTTERNUT.—*Juglans cinerea.*

AFFECTING THE TRUNK AND LIMBS.

187. Spotted Leptostylus, *Leptostylus macula*, Say. (Coleoptera. Cerambycidæ.)

Under the bark of old decaying trees, a grub similar to that of the Prickly Leptostylus No. 4, changing to a pupa in its cell and early in July giving out a small thick long-horned beetle of a brown or chestnut color with the sides of its thorax and a band on its wing covers ash-gray, the latter sprinkled over with coarse punctures and large blackish dots, the thorax on each side of its disk with a black stripe interrupted in its middle. Length 0.25

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to 0.30. The bark of old trees will sometimes be found everywhere filled with these grubs, which in the month of June may be seen changed to short thick pale-yellow pupæ with a few perfect insects that are newly hatched and have not yet left the tree.

188. BUTTERNUT BARK-LOUSE, *Aspidiotus Juglandis*, Fitch. (Homoptera. Coccidæ.)

Fixed to the bark of the twigs, minute pale brownish scales resembling those of the Apple bark louse No. 15, but smaller and not curved. This species was alluded to in my first report, Transactions of 1854, p. 739. I have not yet had an opportunity to trace out its history. Although this is so minute that the naked eye can scarcely discern many of the scales, it is preyed upon by a parasitic larva still smaller, which resides under the scale and feeds upon the eggs which the scale covers, changing to a minute four-winged fly of the family *Chalcididæ* in the order *Hymenoptera*, which gnaws a small round hole in the side of the scale through which to make its escape.

189. BUTTERNUT SCALE INSECT, *Lecanium Juglandifex*, new species. (Homoptera. Coccidæ.)

Adhering to the bark on the under side of the limbs, a hemispheric dull yellowish or black scale about 0.22 long and 0.18 broad, notched at its hind end, frequently showing a paler stripe along its middle and a paler margin and transverse blackish bands.

Whether this is the same insect with the European *Lecanium Juglandis* of Bouche, I am unable to ascertain, as I have at hand no description of that species. The details which I herewith present of our American insect will probably suffice to enable those who have an opportunity of observing that species to determine whether it is the same.

The male pupæ of this insect may be seen upon the limbs in May. They appear the same with the pupæ of other common species of this genus, being oblong oval, moderately elevated white scales about 0.10 long and half as broad, thin and somewhat hyaline, with a slender snow-white line running lengthwise along each side of the middle and uniting at their hind ends, with a similar line running transversely across the scale half way between its middle and its hind end. The male insects come out

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BUTTERNUT. LEAVES.

from these pupæ the fore part of June. They are long and narrow delicate two winged flies, measuring 0.05 to the tip of the abdomen and a third more to the end of their wings. They are of a rusty reddish color, the thorax darker and the scutel and head blackish, this last being separated from the body by a narrow pale red neck. The antennæ are slender and thread-like, half as long as the body, eight jointed, the basal joint thickest and as broad as long, the second joint narrower and scarcely longer than wide, the remaining joints cylindrical, the fourth slightly shorter than the others and the last rather longer than those which precede it. Two slender white bristles as long as the body are given off from the tip of the abdomen. The wings are transparent but not clear and glassy, and their rib-vein is very distinct and of a reddish color, ending before it reaches the margin of the wing.

The males of the several other species of the genus *Lecanium* which have been briefly alluded to in different parts of this Report will all be very similar to the one now described, differing only in their colors, the joints of their antennæ, and other minor points.

AFFECTING THE LEAVES.

190. TWO-MARKED TREE-HOPPER, *Enchenopa binotata*, Say. (Homoptera. Membracidæ.)

Puncturing the leaves and extracting their juices from July till the end of the season, a small rusty brown or black tree-hopper with two bright pale yellow spots upon its back, which part is prolonged forward and upward into a compressed horn rounded at its tip and giving the insect a resemblance to a little bird with an outstretched neck, and the four forward shanks broad, thin and leaf-like. Length 0.25 to 0.30.

This may always be found upon the butternut the latter part of summer. It occurs also, though less constantly, upon several other trees.

In my catalogue of Homoptera in the State Cabinet of Natural History, I referred this insect to the genus *Enchophyllum* of Amyot and Serville. Mr. Walker, I see, places it in the next genus, *Enchenopa*, of the same authors. It is too similar both in

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its form and spots to the Brazilian *Enchophyllum ensatum** to be generically separated from that species. Indeed the distinction between the two genera is much too slight and vague, in my view, to justify their division. In some of the species which authors place under *Enchenopa* the thorax appears to be as distinctly compressed, thin and foliacious as it is in some of those arranged under *Enchophyllum*. The cells and veins of the wings are also the same in all these insects. It is therefore on good grounds that M. Fairmaire suppresses Dr. Burmeister's section *foliaceo-ensatæ*, the equivalent of *Enchophyllum* and includes all these insects under the one section, *ensatæ*. At the same time we view this group as too widely different and conspicuously marked by the horn-like protuberance of the thorax, to be retained under the genus *Membracis*. We would accordingly drop the name *Enchophyllum*, and include all these insects in the one genus *Enchenopa*, a term meaning sword-faced or sword-fronted, and which is therefore appropriate for all the species of this group.

191. BUTTERNUT TREE-HOPPER, *Ophiderma mera*, Say. (Homoptera. Membracidæ.)

A greenish gray tree-hopper shaped like a half cone, with its apex bright chestnut-red and behind its middle a black band which is sometimes interrupted on the summit of the back, and with a blackish spot on the tips of the hyaline wing-covers. Length 0.36.

I have only met with this insect in a few instances, always upon the butternut. I could find no place for this species among the genera characterised by Amyot and Serville, and therefore proposed a new genus named *Caranota* in my catalogue of Homoptera in the State Cabinet of Natural History. This genus appears to be the same with that named *Ophiderma* by M. Fairmaire a few years before. The single species, *salamandra*, given as the type of this genus, is credited to the state of New-York, and ac-

* Upwards of a dozen individuals of this insect have fallen under my observation, all of which concurred in showing that it is the male sex which is described by Fabricius, whilst the females have been described by M. Fairmaire as a distinct species under the name *quinque-maculata*. A variety of the female occurs, which I name *intermedia*, in which the anterior spot upon the back is merely a faint cloud slightly paler than the ground, whilst the middle frontal spot is bright orange, as usual in this sex.

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cording to the description is marked precisely like the *arcuata* of Say, but the dimensions assigned it are a fourth larger than those of that species.

192. OBTUSE CLASTOPTERA, *Clastoptera obtusa*, Say. (Homoptera. Cercopidæ.)

A short thick almost circular leaf-hopper of a gray color with fine transverse wrinkles and three brown bands anteriorly, its wing covers clouded with tawny brown with streaks of white and a coal black spot near their tips. Length 0.22.

From the middle of July till the end of the season this insect may frequently be met with on quite a number of different trees and shrubs. Although the species of this American genus very much resemble those of the genus *Penthimia* they certainly pertain to the family Cercopidæ and not to that of Tettigoniidæ in which they are placed by Mr Walker.

193. BUTTERNUT TINGIS, *Tingis Juglandis*, new species. (Hemiptera. Tingidæ.)

Puncturing the leaves and sucking their juices, a small singular bug resembling a flake of white froth, its whole upper surface composed of a net-work of small cells, an inflated egg-shaped protuberance like a little bladder on the top of the thorax and head, the sides of the thorax and of the wing covers except at their tips ciliated with minute spines, the wing covers flat and square with their corners rounded, a large brown or blackish spot on the shoulder and a broad band of the same color on their tips with an irregular whitish hyaline spot on the inner hind corner; the body beneath small and black, the antennæ and legs honey-yellow. Length 0.14.

This insect becomes common on the leaves of the butternut in May and continues through the summer and autumn. It may sometimes be met with also on birch, on willows, and other trees. It corresponds with the *arcuata* of Say (Heteropterous Hemiptera, p. 27) in every respect, except that the outer margin of the wing covers is rectilinear and not arcuated or concavely excavated, and their veins are not ciliated with minute erect spines. I have never met with the *arcuata* in the state of New-York, but have gathered it from bushes in the outskirts of the city of Chicago.

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Both species are very similar to the *Tingis rhomboptera* described in Fieber's excellent monograph of this family, and figured, plate 8 fig. 37, but that has a spot on the middle of the outer margin of the wing covers and their tips much less discolored with brown than in our insects.

194. BUTTERNUT WOOLY-WORM, *Selandria? Juglandis*, new species. (Hymenoptera. Tenthredinidæ.)

A worm remarkable for being enveloped and wholly hid in a thick coating of snow-white flocculent meal which falls off with the slightest touch, resides in companies on the under sides of the leaves, feeding upon them, in the month of July. It is of a cylindrical form, a very little tapering from its head to its tip, and has ten pairs of dull pale yellow feet, its body being of a blackish color and its head pale yellow and polished, with a large black dot upon each side. It has numerous transverse impressed lines and a groove on the middle of its back its whole length. The individuals I have examined were nearly half an inch in length. My attempts to rear them have proved unsuccessful. In one instance the leaf on which they were found was pinned to a leaf of a butternut growing in my yard, without disturbing them, but they refused to move from their original abode and perished as the leaf withered. They are evidently a species of saw-fly, pertaining there is scarcely a doubt to the genus *Selandria* and the sub-genus *Eriocampa*, thus named from its larvæ being covered with pruinose woolly matter.

The HICKORY TUSSOCK-MOTH No. 183, occurs about as frequently on the butternut as on the walnut, and two other caterpillars belonging to the same genus but which are not yet known to us in their perfect state are also common upon this tree. Other caterpillars and worms which have been observed feeding upon the leaves of the butternut are the larvæ of

The WHITE MILLER No. 125;
The FALL WEB-WORM No. 88;
The CECROPIA EMPEROR MOTH No. 33;
The POLYPHEMUS MOTH No. 181; and
The BLACK-WALNUT SPHINX No. 186.

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15. THE CHESTNUT.—*Castanea vesca.*

AFFECTING THE TRUNK AND LIMBS.

We have never noticed any boring insect of a large size in the wood of this tree. But the durability of its timber, which is so highly valued, particularly for fence rails and posts, is much impaired by small insects which perforate it with holes that are only of sufficient size to admit the head of a pin, but which are often excessively numerous, and being pierced directly inward towards the heart of the tree become filled with wet from every shower. The decay of the wood is hereby greatly accelerated. These perforations are made by a slender cylindrical six-footed worm, half an inch long, of a white color and brownish yellow at each end, its apex cut off abruptly and obliquely and edged with small black teeth. The beetle that is produced from this worm is not yet ascertained.

Rails which have been pierced with pin-holes by this insect should always be placed in the fence with their sap side downwards, as it is upon this side that these holes mostly open.

195. TWO-TOOTHED SILVANUS, *Silvanus bidentatus*, Fab. (Coleoptera. Mycetophagidæ.)

Under the bark of logs and decaying trees, probably loosening the bark from the wood, a minute, narrow, flattened beetle, of a light chestnut-brown or rust-color, its thorax longer than wide, slightly narrowed towards its base and with a small tooth projecting outwards at each of its anterior angles. Length 0.10 to 0.12.

This is a European insect, which, like a kindred species, the Surinam Silvanus, has now become perfectly naturalized and as common throughout the United States as it is in its native haunts. On stripping the bark from recently cut logs of chestnut and of oak, this minute beetle, which is so flattened and thin that it can creep into the slightest crevices, will be found frequently in considerable numbers. We have several other insects which inhabit similar situations and are so much like this that a careful examination is requisite to determine their respective species. By the

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CHESTNUT. TRUNK.

characters which are subjoined, in addition to those above stated, the Two-toothed Silvanus may be recognized.

Its head and thorax are often of a darker shade than its wing covers, especially in the moist living specimen. Its wing covers have rows of close punctures with a slightly elevated line between each alternate row. Its thorax also is densely and confluently punctured, and commonly shows a very faint elevated longitudinal line in its centre. The angles at its base on each side are obtuse, and from these angles forward to the projecting tooth the lateral edges are crenate-dentate, having sixteen little elevated tubercles or minute teeth jutting out at equal distances along the margin. The point of the large anterior tooth forms a right angle. Upon each side of the head behind the eye is also a minute tooth of the same size with those along the sides of the thorax. The surface is slightly clothed with minute inclined bristles.

In every group of these insects individuals will probably be found of the following *varieties:*—

a. bisulcatus. The basal part of the thorax with two shallow grooves. The few specimens which I have received from the south are all of this variety and have the grooves deeper and more distinct than they are in any of my New-York specimens. Erickson supposes this variety to be the *Colydium sulcatum* of Fabricius, but this can scarcely be, since Fabricius characterizes that species as having the wing covers smooth and makes no allusion to any projecting teeth upon its thorax.

b. carinatus. A distinct elevated line upon the middle of the thorax its whole length.

c. planus. Thorax wholly destitute of a longitudinal line on its middle.

196. AMERICAN WHITE ANT, *Termes frontalis,* Haldeman. (Neuroptera. Termitidæ.)

Myriads of white ants mining in and wholly consuming the interior of fence posts and stakes whilst the outer surface remains entire.

This insect has received its scientific name in allusion, I suppose, to the deep notch which occurs in front upon the heads of the soldiers, but as many other species are notched in the same manner, I think the common name which I give it will be its most appropriate designation, since it is common all over our country, and is the only species of white ant which we have in the United States. The workers or larvæ which form much the most numerous portion of each colony of these insects, are 0.18 to 0.20 long, white and glossy, with pale brownish abdomens irregularly clouded with white. Winged individuals, supposed to be the males, make their appearance in the month of May.

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CHESTNUT. TRUNK.

They are of the same size with the preceding but are of a glossy black color, with the mouth, shanks, feet and tip of the abdomen pale yellow, and with four large wings which are twice as long as the body, and hyaline but not clear like glass. About the beginning of June, during the dampness of the mornings preceding pleasant days, these winged white ants leave their retreats and come abroad, and the air is everywhere filled with countless millions of them. The soldiers resemble the workers, but are 0.25 long with enormously large heads twice as long as wide and their opposite sides parallel, with stout jaws half as long as the head and of a blackish chestnut color.

Decaying stumps and logs lying upon the ground, especially those of pine and other soft wood, are everywhere occupied by these insects. The cavities which they excavate become thronged with myriads of them. Fortunately for us it is only soft damp wood in which they work; hence the dry timbers and furniture of our dwellings are exempt from that havoc which some of these insects occasion in tropical countries. But the posts and stakes of our fences furnish a congenial resort for them, that portion which is under ground being always sufficiently damp to answer their requirements. Posts in particular from which the bark has not been removed, whereby these creatures can remain hid from view whilst they consume the soft sap wood immediately under the bark, are a favorite abode for them. And as the sap wood becomes destroyed they extend their burrows through the more solid heart wood. I have seen a fence four years after it was built, every post of which was reduced to a mere shell by these insects, though externally there was not the slightest indication of the mischief that was going on within.

AFFECTING THE LEAVES.

197. CHESTNUT TREE-HOPPER, *Smilia Castanea*, Fitch. (Homoptera Membracidæ.)

Puncturing the leaves and extracting their juices, a triangular tree-hopper shaped much like a beechnut, of a blackish color, tinged with green more or less when alive, its head and the anterior edges of its thorax and all beneath bright yellow, its fore

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wings clear and glassy with a blackish spot on their tips and another on the base which is often prolonged along the middle of the wing and united with the hind spot. Length of the male 0.25, female 0.30. This is a common insect on chestnut leaves in the month of July, and I have never met with it upon any other vegetation.

198. UNADORNED TREE-HOPPER, *Smilia inornata*, Say.

A tree-hopper of the same size and shape with the preceding, but of a light green color fading to light yellow, with a slender black line along the upper edge of its back and a very slight duskiness on the tips of its glassy wings. This is quite common on the chestnut and on oaks from the beginning of July till the last of September.

The UNARMED TREE-HOPPER No. 64, is also met with on the chestnut in May and July, and at first sight appears identical with the preceding species. It may be distinguished from it by the hind end of its thorax, which is drawn out into a slender, sharp point, and its breast, which is black.

199. CHESTNUT GAY-LOUSE, *Callipterus Castaneæ*, new species. (Homoptera. Aphidæ.)

On the under sides of the leaves, puncturing them and sucking their juices in August and September, a small sulphur-yellow plant-louse, with black shanks and feet, its antennæ also black except at their bases and as long as the body, its wings pellucid, their first and second oblique veins and the tip of the rib-vein edged with coal-black, and its thighs straw-yellow. Length 0.09, to the tip of the wings 0.15.

This insect, in company with wingless larvæ and pupæ of the same color, may frequently be met with upon the under sides of chestnut leaves. The name "gay-louse," which is of the same import with the generic term *Callipterus*, and is the equivalent of the German name *zierlaus* which Koch applies to these plant lice, will be the most appropriate designation which our language furnishes for this and the other species of this genus, several of which have already been noticed in the preceding pages, (No. 20, 167–171.) Their bright, lively colors, and their long, slender

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antennæ and legs render them the prettiest objects belonging to the aphis family.

203. CHESTNUT LEAF-WITHERER, *Phylloxera? Castaneæ*, Haldeman. (Homoptera. Aphidæ.)

In August and September, on both sides of the leaves, puncturing them and extracting their juices and causing them to curl, a very small louse-like fly of a bright sulphur-yellow color with a black thorax, breast and eyes, its feet and antennæ tinged with blackish and its wings translucent. The wingless individuals associated with it are entirely yellow wiith red eyes.

I have never met with this species. The veins or nerves of the wings are described as follows: "First and third transverse nervures normal; second arising from the middle of the first and terminating in the normal position; posterior wings without nervures." From this description the veins appear to be essentially different from those of the genus *Chermes*, to which Prof. Haldeman refers this species. And I cannot but think that more exact observations will detect a rib-vein in the hind wings, and will show that this insect pertains to the genus *Phylloxera*.

The larva of the AMERICAN MAPLE MOTH (*Apatela Americana*, Harris), a large thick-bodied caterpillar two inches long and of a pale yellow color with two black pencils above on the fourth and sixth rings and a single one near its tip, feeds upon the leaves in August, but is much more common on the maple, under which head it will be described.

AFFECTING THE FRUIT.

One would suppose that the fruit of the chestnut, wholly inclosed as it is in a thick leathery bur, the surface of which is crowded with prickles with their needle-like tips pointing in every direction, was so effectually protected that no depredator could possibly reach it, or if attacked, we should think it could only be by some small insect panoplied like the rhinoceros, its hard shelly coat enabling it to encounter these prickles without harm. It is most wonderful, therefore, to discover that a little insect with a soft tender body, has the artifice of inserting its eggs

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at a particular point in the tip of this ball-like bur, where its young can penetrate inwards and subsist upon the fruit.

Dr. Harris (Treatise, p. 65,) speaks of a "weevil grub" as being very common in the chestnuts of this country. But the worm which I have met with in these nuts is the larva of a moth and not of a weevil. It grows to more than a half inch in length, and is cylindrical and thick, of a dirty white color with a tawny yellow head, and sixteen feet. It eats the meat of the nut mostly at its tip and on its convex side, the cavity which it makes being filled with little brown and whitish grains; and a small hole is perforated upon one side of the nut at its tip, out of which a portion of these grains are protruded. I have not yet succeeded in rearing this worm, and am therefore unable to give a description of the moth which is the source of this mischief.

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16. THE HAZELNUT—*Corylus Americana.*

AFFECTING THE STALKS.

201. HAZELNUT BARK-LOUSE, *Lecanium Corylifex*, new species. (Homoptera. Coccidæ.)

On the under side of the stalks and branches, adhering to the bark, a smooth shining hemispheric scale of various colors, from pale dull yellow and deep tawny red to black, many individuals showing a paler stripe along the middle and others with transverse black bands, the surface often sprinkled over with projecting scales of a white wax-like substance. This is commonly small in size, being but about 0.14 in length, but some specimens are larger, measuring 0.20. A similar insect is common upon the European hazlenut, but is said to be of an orange-yellow color with red spots; I therefore infer it to be a different species.

AFFECTING THE LEAVES.

202. HAZELNUT TREE-HOPPER, *Telamona Coryli*, Fitch. (Homoptera. Membracidæ.)

Puncturing the leaves and sucking their juices the latter part of June, a triangular tree-hopper of a pale dull yellow color with

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a hump upon the middle of its back of the same shape as in the following species, with a rust-colored band occupying the anterior end of this hump and a curved one margined with black crossing its posterior end, the hind end of the thorax being also rust-colored, and the tips of the fore wings with oval blackish spots in the intervals between the ends of the veins. Length 0.32. Rare.

203. SAD TREE-HOPPER, *Telamona tristis*, Fitch.

Extracting the juices of the leaves and succulent twigs in August, a tree-hopper of the same shape with the foregoing but of a much darker dull yellow or blackish color sprinkled over with pale dots and without any transverse bands; the elevated hump upon the middle of the back almost as high posteriorly as at its forward end, its upper edge straight and at the anterior end abruptly rounded, its hind end forming almost a right angle and its posterior base deeply excavated and forming the third part of a regular circle; an elevated polished black line along the middle of the thorax its whole length, with a few pale alternations, and widely interrupted with white in the excavation at the posterior base of the hump; one or two small hyaline spots in the upper edge of the hump; three black dots above each eye; a black spot on the tip of the wings; under side pale dull yellow. Length 0.35.

The OBTUSE CLASTOPTERA No. 192, and the BOUND TREE BUG No. 100, also occur on the hazelnut, and its leaves are sometimes consumed by a large pale green worm, the larva of the LUNA MOTH No. 180.

204. ELONGATED FORKED-CLAW, *Dichelonycha elongatula*, Gyllenhal. (Coleoptera. Melolonthidæ.)

Eating the leaves the latter part of May and in June, a narrowish cylindrical black beetle margined with chestnut brown, its wing covers shining yellowish-green margined with pale yellow, its under side pale yellow covered with short white incumbent hairs, and its legs pale yellow with the hind shanks except at their bases and the hind feet blackish. Length 0.33.

This is a common insect, usually found upon hazelnut bushes. It was first described by Fabricius in the year 1791, under the

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name *Melolontha elongata*, but Olivier had previously given this same name to a much larger South American beetle. It therefore became necessary to re-name this species, and we accordingly in the next record that is made of it (Schonherr's Syn. iii, 210), find the Fabrician epithet changed to *elongatula*. Thus the latter comes to be the legitimate name of this insect. Dr. Le Conte appears to have overlooked these facts and goes back again to the Fabrician name. In Dr. F. E. Melsheimer's Catalogue the genus *Dychelonycha* is credited to Dr. Harris. Dr. H. originally proposed the name *Dichelonyx* for this genus, but gave no description of it; and it is therefore to Mr. Kirby that we are indebted for this name and genus as it at present stands.

205. LINEAR FORKED-CLAW, *Dychelonycha linearis*, Gyll.

In company with the preceding, a beetle closely resembling it but slightly larger and having its thorax covered with short prostrate yellow hairs.

206. BACK'S FORKED-CLAW, *Dichelonycha Backii*, Kirby.

Occasionally found in company with the preceding, a beetle differing from it by having its antennæ and forward thighs blackish instead of pale yellow.

207. GREEN-STRIPED FORKED-CLAW, *Dichelonycha subvittata*, Leconte.

Associated with the foregoing, a beetle resembling the elongated forked-claw, but having a shining deep green spot on the shoulder and another on the tip of each wing cover, these spots sometimes connected by a green stripe on the middle of the wing cover its whole length, and its hind shanks and feet not discolored with blackish. Dr. Le Conte credits this species to Lake Superior, but it is common also through Northern New-York and Vermont.

208. HAIRY ATTELABUS, *Attelabus pubescens*, Say. (Coleoptera. Attelabidæ.)

Eating holes in the leaves in June and July, a short thick-bodied dull red or yellow weevil, its surface covered with short pale yellow prostrate hairs which are often rubbed off in places, and its breast black. Length about 0.20.

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HAZELNUT. LEAVES.

Mr. Say described this species in the year 1826, and it is probably since that date that Prof. Bohemann's name *Rhois* was published, which name moreover is inappropriate, as it indicates this insect to inhabit the sumach, whereas it is upon the hazelnut that it is uniformly met with. It is a common species, and sits upon the leaves in the posture of a dog, with its long fore legs braced outwards and elevating its head high above its body. Its larva probably subsists upon this shrub, but its habits are as yet unknown to us.

AFFECTING THE FRUIT.

209. STRAIGHT-BEAKED NUT-WEEVIL, *Balaninus rectus*, Say. (Coleoptera. Curculionidæ.)

A small yellowish drab-colored weevil with a long slender beak not thicker than a bristle and having the jaws placed at its tip with which it bores a hole into the nut when it is young and soft, and drops therein an egg which it crowds into the nut with its beak. A small white footless worm hatches from this egg, which feeds upon the meat of the nut and gnaws a small hole through its side, out of which when full grown it escapes and buries itself in the earth to pass its pupa state.

We are not certain as to the species of weevils which produce the grubs in our American hazelnuts, walnuts and acorns. As the Straight-beaked weevil has a long slender beak similar to that of the species which breeds in the hazelnuts in Europe, and as I have met with numbers of this insect upon hazelnut bushes the latter part of June, there can be little doubt but it was there for the purpose of depositing its eggs in the young fruit. Dr. Harris records the Long-beaked nut-weevil No. 185, as occurring also upon hazelnut bushes, and it may be that both these insects infest this fruit. They are much like each other, differing chiefly in their beaks, which in the present species is but half the length of the body and usually straight nearly to its tip, where it is curved downwards, but in some individuals it is slightly curved through its whole length, and is of a pitchy black color tinged in its middle with chestnut-brown. Its body is clothed with prostrate drab-yellowish hairs on a blackish rust-colored ground. These

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HAZELNUT. LEAVES.

hairs often form a faint stripe on each side of the thorax, which also shows an obtuse elevated line on its middle. Its scutel is oval and ash-gray. Its wing covers have punctured impressed lines, and the hairs being rubbed off in places, irregular spots of a rusty color are produced. The under side is clothed with short prostrate ash-gray hairs, which are less dense upon the chestnut-brown legs. It measures 0.30 in length, exclusive of its beak.

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SUPPLEMENT.

As stated in the introduction to the present Report, a few pages are here devoted to some of those insects which have come under my observation, which do not pertain to the noxious class but are yet too interesting on various accounts to be withheld from the public. The limits, however, to which I find myself restricted oblige me to omit several species which I had purposed noticing.

210. EMASCULATING BOT-FLY, *Cuterebra emasculator*, new species. (Diptera. Œstridæ.)

The history of this remarkable insect will be best presented by extracting from my manuscript notes the successive memoranda therein entered relating to this subject.

August 13th, 1856. Peter Reid of Lakeville informs me that his cat yesterday brought into the house a striped squirrel (*Sciurus striatus*.) On taking it into his hands he noticed its scrotum was enormously swollen and hard, with an orifice in it about the size of a wheat straw, and on pressing it with his fingers he could distinctly feel the writhings of something alive in this tumor. On enlarging this orifice with the point of a pen knife he discovered it was a large grub lying with its tail to the opening. It discharged at intervals three large drops of a fluid resembling grumous blood mixed with purulent matter. On pressing upon it so as to protrude the tail end of its body slightly out of the opening it exerted itself to crawl out, forcing its fluids into the part which was out of the orifice so that it became swollen and hard, and then regurgitating them into the body again, whereby the extruded portion became soft and collapsed, thus pressing upon and dilating the orifice, so that with three or four repetitions of

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this motion it worked itself out and dropped upon the floor. It proved to be a very large soft blackish grub with numerous paler spots. It was about an inch long and half as broad, oval, slightly depressed, divided into segments, with its surface covered with small, shining elevations resembling the granular surface of morocco leather. It had no feet or jaws that he could perceive. On showing him the figure of the larva of *Œstrus Bovis* in Westwood's Introduction, vol. ii, page 580, fig. 1, he recognizes a resemblance to that altogether more than to any of the other larvæ figured in that part of the volume. It seemed from its motions to be a formidable, ferocious creature. He put some damp chip dirt into a tin box and placed it thereon, it having been exposed to the air only about four minutes. It immediately worked its head down into the dirt and soon buried itself, evidently understanding what it was about. Mr. Reid brings this box and the squirrel to me. I sink the box in a flower bed in my yard and invert a glass tumbler over it. On examining the squirrel I find the fleshy glandular tissue of the testicles wholly consumed, nothing of them remaining but their empty outer skin. Mr. Reid says the fact is well known to hunters, that of the grey and other squirrels killed in this vicinity, at least one half of the males are castrated. It is the current opinion with them that this deformity is caused by the squirrels' seizing and biting out the testicles of their comrades, some of them strenuously maintaining that they have seen these animals engaged in this act. There are some hunters, however, that say they have found two grubs in the scrotum of some squirrels, and they conjecture that it is by these that the testicles are destroyed.

August 22, 1856. Mr. Hurst, Taxidermist of the State Cabinet of Natural History, informs me that on one occasion he saw a half dozen red squirrels (*Sciurus Hudsonius*) unite in mastering a gray one (*S. Caroliniensis*) and castrating him. He had so fair and distinct a view that there could be no mistake as to the fact, his eyes witnessing the very work in which the animals were engaged. *Query.* May it not be a flesh-fly which drops its egg into the wound of the castrated squirrel, from which grows the grub which Mr. Reid brought me?

September 1st, 1856. Mr. Reid brings me a striped squirrel

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with two grubs in its scrotum, considerably torn and injured by the coarse shot with which it was killed. These grubs are plainly the larva of a bot-fly and not of a flesh-fly. They are placed lengthwise in the scrotum, one forward of the other, producing a tumor nearly an inch and a half in length. Each worm has a cavity for itself, separated from the other, with an orifice towards its hind part, larger than the head of a large pin. Though the worms are probably immature the testicles appear to be entirely consumed, but the parts are so torn that I do not attempt to trace out the exact lesion which they have produced.

Of these two LARVÆ that which is least injured is 0.65 long and 0.44 broad. The other is smaller, being only 0.32 broad. They are oval, moderately depressed, more flattened beneath than above, rounded at one end and somewhat pointed at the other, of a coal black color and shining, the whole outer surface being covered with slightly elevated small hard angular granules, like shagreen, but without any projecting spines or teeth-like processes. The skin is remarkably thick and tough like leather, and the rough angular points with which it is covered must produce much irritation in the tumor, especially when the worm moves. It is divided into ten segments by deeply impressed transverse furrows, each segment forming a prominent ridge which is most elevated towards its hind edge. Towards the outer side each ridge is cut across by a conspicuously impressed longitudinal line, giving the worm a three-lobed appearance similar to that of a trilobite fossil. On the under side is an analogous impressed line, and between these at equal distances along each side are two others less deeply indented. The mouth does not show any jaws or other appendages externally but appears like a simple elliptic orifice placed transversely; and the perforation at the opposite end is similar. The specimens, however, are so mutilated that they do not afford a satisfactory examination. The worm is much like the figure in Westwood above referred to.

July 29th, 1857. I have repeatedly raised the tumbler to see if the worm buried last August had hatched, and began to despair of obtaining anything from it, when to-day, to my great joy, I find a large fly lying upon its back, dead, upon the surface of the dirt in the tin box, with the ends of its wings worn off from flying in its narrow prison, but perfect in every other respect. It proves to be of the bot-fly family (*Œstridæ*) and of the genus *Cuterebra* of Clark, thus named from two Latin words, *cutis terebra*, i. e. skin borer or skin piercer, this genus being distinguished by having the bristle of the antennæ feather-like or ciliated with a row of fine hairs along each side, and showing a distinct orifice

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at the mouth—several of the bot-flies being destitute of any opening at the mouth and taking no nourishment after they reach their perfect state. Nine species have been described by different authors as pertaining to this genus, all of them belonging to America save one which occurs in India. Nothing, however, appears to be known of the habits of the flies of this genus, except that the larvæ of two of them, which are found in the state of Georgia, reside under the skin of the rabbit. And this species appears to be different from any of those heretofore described. It is a large thick-bodied fly nearly three-fourths of an inch long, its head, thorax and abdomen of the same width, with the abdomen but little longer than wide and its smoky brown wings of about the same length with the abdomen and held together flat upon it. Its thorax is covered with whitish hairs which are more dense upon the sides, where is a large black dot. Its face is white with a large black dot upon each cheek, and the last segment of its abdomen is clothed with whitish hairs.

The dirt in the box had a depth of about two inches and the worm had penetrated to its bottom and there changed to a pupa, its outer skin becoming dry and hard and forming the outer covering or pupa-case of the insect.

This PUPARIUM is 0.80 long and 0.40 broad, nearly cylindrical, though flattened anteriorly in the region of the breast, and rounded at both ends. It is of a tough crustaceous substance, as thick and hard as the shell of a chestnut, and its whole surface is rough like shagreen, being crowded with elevated black shining points, to which a coating of dirt adheres as though it were glued thereto. It does not show any elevated transverse ridges, like those upon the larva, but six impressed lines or sutures are very perceptible, dividing it into seven segments which are mostly of equal length. The anterior one of these segments breaks off obliquely at its suture, to enable the fly to escape, the piece thus separated being a large roundish or egg-shaped scale, more broad than long, being 0.30 broad, and this scale shows upon its inner surface two curved elevated lines, which are sutures dividing it into three segments of nearly equal length; and at its anterior end is a small fourth segment marked by a strong depression in the surface. We thus find a total of ten segments in the pupa-case, the same number which we saw in the larva, those representing the head and thorax being much changed and soldered together into a single flattish piece instead of the circular rings which they formed in the larva. The small anterior segment has a wide shallow notch on its forward edge, on each side of which, exteriorly, is a round tuft or button composed of a mass

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of short pale yellow hairs evenly shorn at their tips and projecting out from the surface, and opposite these tufts on the inner surface is a small round spot of the same yellow color, formed of exceedingly fine lines radiating from the centre to the outer margin of the spot, which is bounded by an elevated ring or hoop which is also of a pale yellow color. From this description the entomologist will perceive that the pupa-case of this fly is analogous in almost every particular with those of many other insects of this order.

The FLY is a female and measures 0.70 in length to the tip of its abdomen and wings. Its *head* is black above, with close fine punctures, and is densely covered with short erect black hairs; its under side is brownish flesh-colored, closely punctured and clothed with white hairs which incline inward towards the mouth. Upon each cheek, below the eye and adjacent to the outer edge of its orbit, is a large shining black dot, in which the punctures are coarser and more distant from each other, and the space between this and the eye is darker brown. The antennæ are dark liver-brown and have a few whitish hairs overlying their bases, like eye-lashes. Their bristle is black at its base and the fine hairs with which it is ciliated are whitish. The cavity in which the antennæ repose has an ash-gray reflection, and on each side between this cavity and the eye is an elevated smooth shining space which is coarsely punctured. The *thorax* is black, finely punctured and clothed with soft hairs which incline backwards and appear of a tawny brown color when viewed from above but when seen from the side are white slightly tinged with yellow. Upon each side these hairs are much more dense, and half way from the wing-socket to the lower edge of the eye is a dot formed of black hairs. The scutel is black and clothed with black hairs. Beneath it on each side is a small yellowish-white dot, from which a short white line extends outwards. The *abdomen* is black, shining, densely punctured and covered with fine short hairs which incline backwards, those at the base being longer and those on the last segment tawny yellowish-white when viewed laterally but appearing black when seen from above. The segments are prolonged to the under side of the body, where their ends are of a glaucous grayish color with a large black dot upon each. The *legs* are black and covered with short black hairs, those towards the tip of the forward thighs on the hind side being yellowish white. The *wings* are smoky brown and imperfectly hyaline. At the base on their inner side is a large lobe of a square form with its corners rounded and its inner edge slightly concave. The winglets are blackish and opake with a narrow chestnut-brown margin.

A specimen of this same insect, sent me from west of Arkansas by William S. Robertson, varies in having the hairs upon the last segment of the abdomen much more dense, causing this segment to appear of a yellowish-white color, and the ends of the other segments are but obscurely tinged with gray without any black dot.

From what has now been stated I think that every one will agree with me in the opinion that it is by this fly that the squirrels in our country are emasculated, and that this remarkable

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fact in our Natural History which has hitherto been involved so deeply in doubt is hereby satisfactorily elucidated. But what are we then to think of the statement of Mr. Hurst, above related, and much other testimony of the same purport. The act which these persons aver that they have witnessed is so unnatural and so much at variance with everything which has been observed elsewhere in the domain of nature, that no scientific writer, that I am aware, has given any credit to these statements. Yet the testimony appears to be too explicit and positive to be wholly rejected. I am therefore led to believe that these animals do attack each other in the manner that has been stated; not, however, for the purpose of emasculating their comrades, as has been supposed, but for the purpose of coming at and destroying these bot-grubs, the enemies of their race. We know the terror which some of these bot-flies give to the animals on which they are parasites, and the efforts which such animals make to escape from them. The squirrel also is undoubtedly conscious that this insect is his greatest foe; he probably has sufficient intelligence to be aware that from the grub which is this year tormenting one of his unfortunate comrades, will come a descendant which next year may afflict him or some of his progeny in the same frightful manner. Hence his avidity to destroy the wretch and thus avert the impending calamity. Future observations must determine whether this conjecture is correct. We fervently hope that the sportsman or other person who next witnesses a squirrel overpowered by its fellows in the manner stated, will kill that squirrel and let the world know whether he does or does not find in it one of these grubs. If a grub is discovered, no doubt can remain as to the object of the other squirrels in making the attack which they do.

The fact has repeatedly been noticed of the squirrels in our country, that they sometimes become excessively numerous throughout a particular district, doing much injury to the corn and other crops of the farmer, both in the field and in the barn, and that they then suddenly disappear, so that scarcely one of these animals is anywhere seen. Writers on our Natural History adverting to this fact, say that their food becoming exhausted in the section of country where they are thus numerous, they migrate to

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other districts. But it now becomes altogether more probable that this sudden thinning in the ranks of these creatures is caused, not by their migration, but by their increase being suddenly arrested by this insect. Recently the field mice have been very abundant all over our country, and complaints were everywhere made of apple and other trees being girdled and destroyed by them in the winter of 1855–'56. The same causes which produced such unusual numbers of these vermin appear to have favored the increase of other small animals also. In my own vicinity at least, the squirrels, having been quite plenty in the preceding years, became unusally numerous last year, and from the readiness with which individuals containing parasites were then obtained, it is evident that the males were generally infested with these insects. The present year, sportsmen inform me there is a remarkable paucity in the numbers of these animals, not a quarter as many being now present in the forests as were found there a year ago. This diminution it can scarcely be doubted, has been occasioned by the insect of which we are treating. And whenever the squirrels are becoming multiplied these parasites will rapidly increase their numbers also. We know what a multitude of eggs a single bot-fly glues to the hairs of a horse's fore legs. If this squirrel-fly is similarly prolific what a host of these unfortunate animals will a single female mutilate, since she places only one or two eggs in each! By some mysterious instinct she undoubtedly knows whether a squirrel is already inoculated, and thus avoids consigning a single one of her progeny where it will be forestalled and unable to obtain the amount of nourishment which it requires. Hence, when the numbers of these insects become but moderately increased, as each female will be intently on the alert to dispose of her stock of eggs, it will scarcely be possible for a male squirrel anywhere to escape them.

Emasculated individuals are met with belonging to each of the species of squirrel common in our country. It is a fly bred from the striped squirrel which I have described above. Whether this same fly attacks our other squirrels also, or whether each kind of squirrel has a distinct species of bot-fly peculiar to it, future observers must determine. As there are two species of these insects residing under the skin of our American rabbits it is quite

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probable there may be more than one species producing this mutilation in our squirrels.

211. LINTNER'S BUTTERFLY, *Vanessa Lintnerii*, new species. (Lepidoptera. Nymphalidæ.)

To discover a new species of butterfly of a large size, in the State of New York, at this day, is quite an achievement, as these insects are such ornaments to collections that they have been sought after with the greatest avidity, and next to the beetles, our larger Lepidoptera have been more fully investigated and are better known than the insects of any other order. The honor of such a discovery belongs to I. A. Lintner, Esq., of Schoharie, a gentleman who takes much interest in the insects of this order, and has communicated to me several valuable facts relating to those which inhabit the section of our State where he resides.

This butterfly is closely related to the Antiopa or White-bordered butterfly, a species which is common upon both sides of the Atlantic. Its wings have perfectly the same form and are similarly colored to those of the Antiopa, but their pale border is twice as broad as in that species, occupying a third of the length of the wings, and it is wholly destitute of the row of blue spots which occur in Antiopa forward of the border. Its ground color is deep rusty brown, much more tinged with liver-reddish than in Antiopa. The fore margin of the anterior wings is black freckled with small transverse white streaks and lines, but is destitute of the two white spots which are seen in Antiopa. The broad outer border is of a tarnished pale ochre-yellow hue, speckled with black the same as in Antiopa, and becomes quite narrow at the inner angle of the hind pair. The wings beneath are similar to those of Antiopa, but are darker and without any sprinkling of ash-gray scales or any whitish crescent in the middle of the hind pair, and the border is speckled with gray and whitish in wavy transverse streaks, without forming the distinct band which is seen in Antiopa. Any further description is unnecessary. A variety of the Antiopa has sometimes been met with in Europe, in which the blue spots are wholly wanting, and individuals occur in this country in which these spots are faint and some of them obliterated. But this butterfly differs from the Antiopa so decidedly in several other characters as to forbid our regarding it as a variety of that species. Its width across the spread wings is 2.75 It was captured in a grove of willows according to Mr. Lintner's recollection.

212. IRENE BUTTERFLY, *Nathalis Irene*, new species. (Lepidoptera. Papilionidæ.)

A small yellow butterfly inhabiting Mexico closely resembles those belonging to the genus *Terias*, but differs generically in having the feelers standing apart from each other, and long and

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bristly, as they are in the genus *Pieris*. It forms the type of a distinct genus, named *Nathalis* by Boisduval, this species being designated *Iole*. A similar butterfly occurs in the valley of the Mississippi, which, from a specimen received from W. S. Robertson, appears to be a distinct species, differing from that of Mexico in having the under side of the fore wings destitute of a blackish central dot, and of the three blackish spots towards their inner angle the hindmost one is here prolonged into a broad stripe extending to the base of the wing and slighly separated from its inner edge; and the base of the wing instead of its outer margin is orange yellow. I therefore propose for this insect the above name. It is but an inch in width across its spread wings.

213. THREE-COLORED LITHOSIA, *Atolmis tricolor*, new species. (Lepidoptera. Lithosiidæ.)

The Vermillion-striped Lithosia, *L. miniata*, Kirby, which is the same insect with the *Gnophria vittata*, Harris, I have met with in New-York only upon the Highlands of the Hudson. A similar moth, but much less bright in its colors, is commonly confounded with that species, from which it differs in having a large lead-colored spot on the centre of its thorax, the head and also the outer margin of the fore wings, their apical edge, their inner margin and the basal half of the stripe on their middle being nankin yellow instead of bright vermillion red, and the hind wings are lead-colored on their outer margin nearly or quite to the base. This is not rare in Washington county, and has been sent me from Schoharie by Mr. Lintner, and from Northern Pennsylvania by Dr. G. F. Horton. Its larva feeds upon the lichens or moss growing on the trunks of trees, the moth coming out in July.

214. GOLDEN LITHOSIA, *Deiopeia aurea*, new species. (Lepidoptera. Lithosiidæ.)

A truly elegant little Lithosia, sent me from Savannah, Georgia, by Mrs. Wm. G. Dickson, has the fore wings bright marigold-yellow with four bands of round pale sulphur-yellow spots upon a brilliant steel-blue ground, the hindmost band almost upon the apex, its outer half abruptly widened and slightly united with the third band, which is the broadest, and towards its outer end is abruptly narrowed and almost interrupted. Its hind wings are

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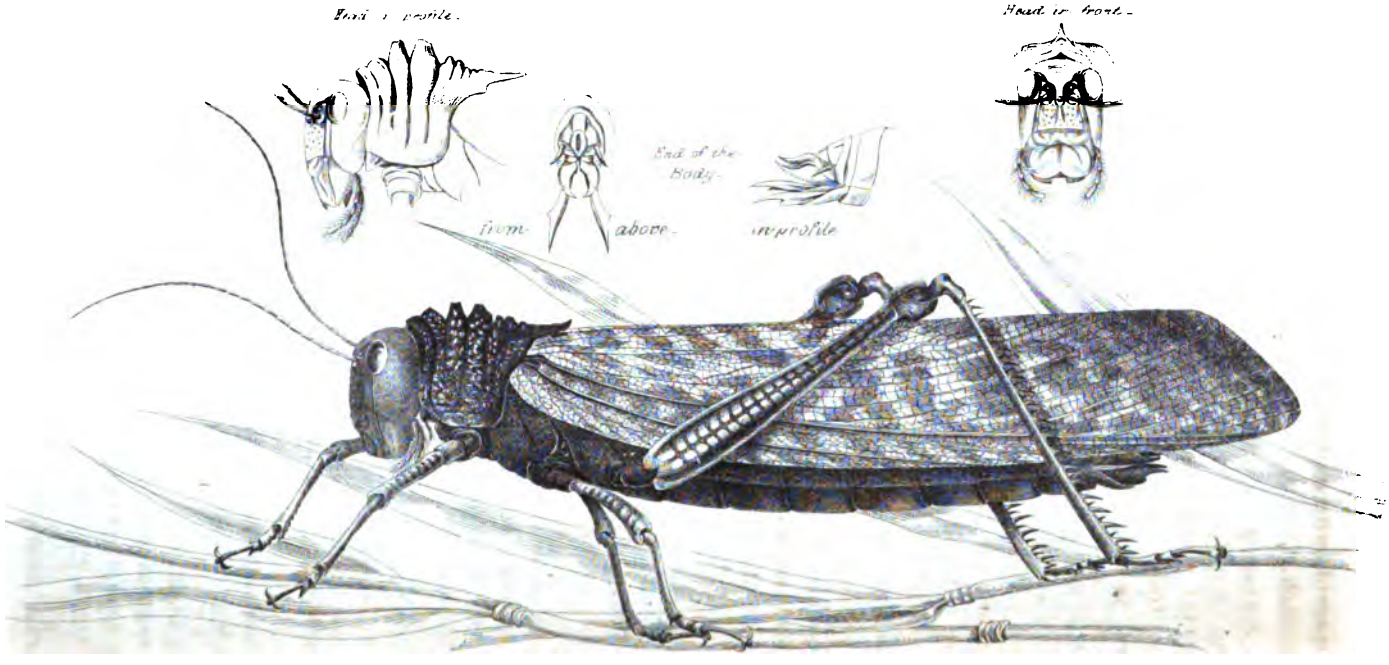
PLATE 3.



Quartz Locust of Central America

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transparent, with a dusky margin and blackish veins. Its width is one inch.

215. JOHNSON'S CICINDELA, *Cicindela Johnsonii*, new species. (Coleoptera. Cicindelidæ.)

Several specimens of a beautiful Cicindela met with in the buffalo trails upon the prairies west of Arkansas were sent me several years since by W. S. Robertson. They are 0.50 to 0.58 long, bright green or blue, the wing covers broadly margined exteriorly with white, from which margin projects inwardly a medial tooth, the rounded anterior end of an apical lunule, and the nearly obsolete posterior end of a humeral lunule; mouth white; antennæ with the four basal joints green, the fifth tawny yellow and the apical joints brown; beneath bright blue clothed on each side of the breast and abdomen with dense white hairs; legs green or purple, the shanks brownish yellow. I dedicate this species to the Hon. B. P. Johnson, Secretary of the State Agricultural Society, and a prominent patron of the examination of our insects now in progress, whose assistance extended in various ways has been of much service in facilitating my researches.

NOTICE OF THE GIGANTIC LOCUSTS OF TROPICAL AMERICA.

The late Lieut. CHARLES M. VAN RENSSELAER, first officer of the ill-fated steamship Central America, William N. Herndon commander, which vessel foundered at sea September, 1857, with a loss of four hundred and twenty-three lives, and bullion to the value of nearly a million and a quarter dollars, when on the trip next preceding that sad catastrophe, gathered at Panama and presented to the State Agricultural Society a number of specimens of a gigantic grasshopper or locust which he had noticed as being common at the isthmus. From the terms in which Lieut. Van Rensselaer is spoken of by those who were well acquainted with him in Albany, the place of his nativity, I doubt not it can truly be said that of the many noble, gallant spirits in the naval service of our country, not one survives, more noble, more gallant than he. Public attention was strongly directed to the devastations produced by insects of this kind, the past season, in consequence of the accounts with which our newspapers abounded, of the swarms of grasshoppers which threatened to lay waste portions of the territory of Minnesota. And it was probably these accounts which prompted Lieut. V. R. to obtain these specimens, and thus show to our citizens that other countries contain creatures of this kind which are vastly more formidable than anything with which we have to contend in our own favored land. As the insects which are thus brought to our notice are the largest of the many species belonging to a group which in all ages of the world has stood pre-eminent for its destructiveness, it is but meet that the

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GIGANTIC LOCUSTS.

carefully executed figures of them which are herewith presented, Plates iii and iv, should have a place in the Transactions of the Society, as a memento of the lamented donor.

When we look upon these huge creatures, the Goliaths of their race, we are led to think that the statement of Pliny is not so gross an exaggeration as has been supposed, when he speaks of grasshoppers which are three feet in length, with legs so large that the people use them for saws. And recollecting what voracious cormorants the insects of this group are, the first query which arises in the mind is, Are these insects common in the countries which they inhabit? And when we learn that they are often quite numerous we next ask, How then is it possible for anything to grow there? A dozen of these insects in one of our gardens would in a few days utterly ruin everything therein. But the same causes which in hot climates give such vigor to animal life as to produce insects of this enormous size, operate equally upon the vegetable kingdom, stimulating it to such a rapidity and exuberance of growth, such a rank luxuriance of development, as appears incredible and miraculous to those acquainted only with the vegetation of temperate and cold latitudes. Hence the havoc which these insects and hosts of others which are akin to them occasion, becomes speedily repaired.

The migratory or Asiatic locust, which, like the Asiatic cholera among diseases, stands most prominent for the sudden and sweeping destruction which it occasions, is one of the largest insects of this kind which inhabit the eastern continent, measuring two inches in length. But in the tropical countries of America four different insects of the same group are met with which are nearly or quite double the size of that noted species. And we are informed that like it, these insects are migratory, uniting together in swarms at times when they are numerous, taking wing, and causing the most frightful devastation in the districts where they alight, often consuming every green thing and leaving the spot as naked and black as though fire had passed over it. Hence the name locust is supposed to have come from the Latin words *locus ustus*, signifying a burnt place.

Whilst the U. S. ship Portsmouth was lying in the harbor of Acapulco, Mexico, in the summer of 1854, Lieut. Thomas Pattison informs me that persons visiting the vessel frequently gave accounts of the terrible havoc which was then going on a few miles back from the coast, from swarms of large grasshoppers which had alighted there; and some of the officers on their return from an excursion on shore, among other things related that they had seen the limbs of trees which were thicker than a man's arm, broken down by the numbers of these insects which had alighted upon them to feed upon the leaves. A large grasshopper which Lieut. P. found upon the coast and which he thought might perhaps be a straggler from these swarms, probably was not the species concerned in this ruin, as it pertains to the group called caty-dids or green grasshoppers (Family *Gryllidæ*) and not to the family of locusts (*Locustidæ*). These two families are readily distinguished from each other by their antennæ, which are short and of equal thickness, like a thread, in the latter, and in the former long, slender and perceptibly tapering towards their

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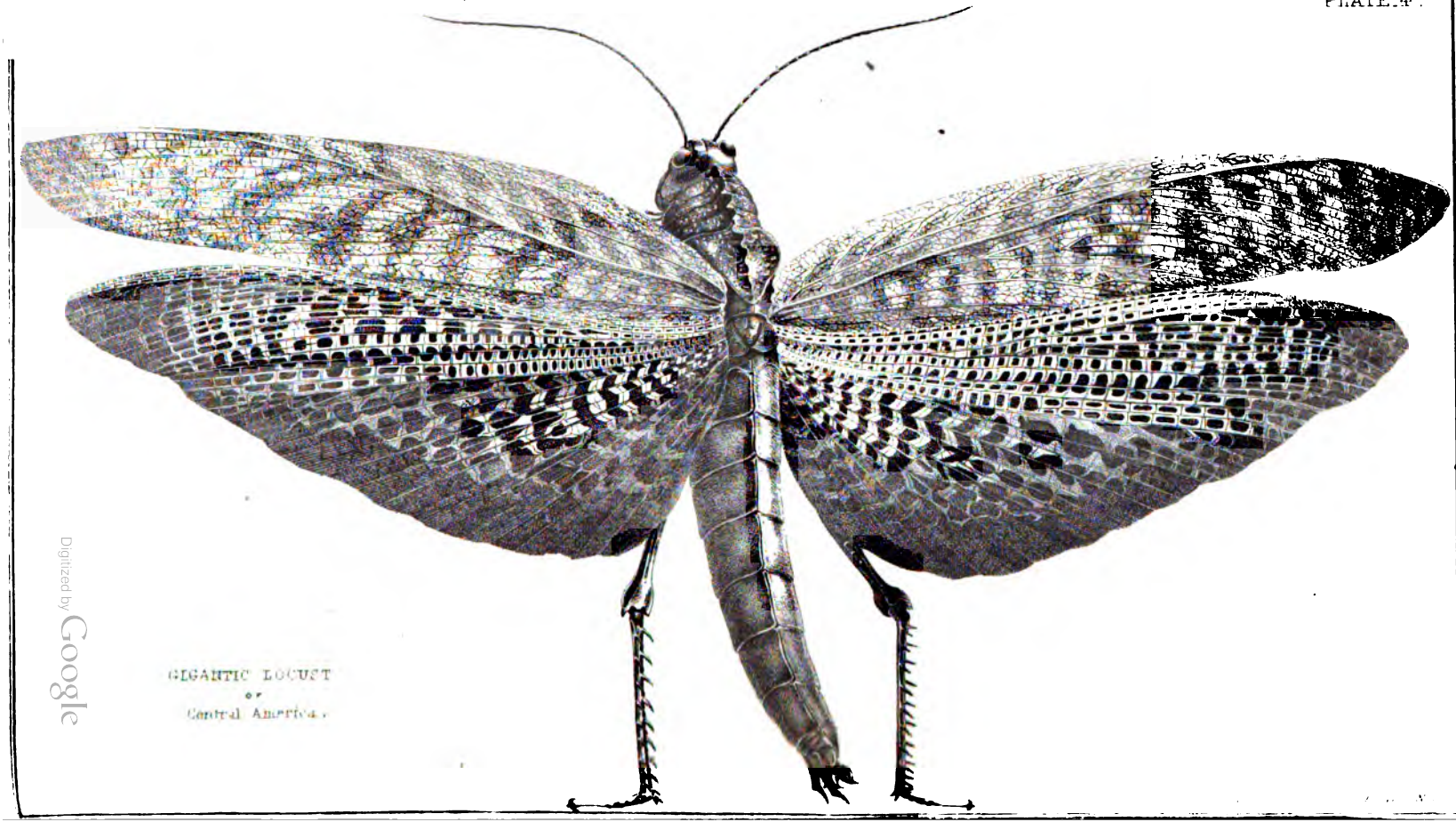

GIGANTIC LOCUST
of
Central America.

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GIGANTIC LOCUSTS.

tips. As the insect presented me by Lieut. P. is remarkable for the length of its antennæ, which surpass those of any species which I find described by authors, I here give a short account of it.

The LONG-HORNED CATY-DID, *Acanthodis macrocerus*, has antennæ four times the length of its body and measuring eight inches or more in length. It is five inches in width and two in length, and is of a pale dull yellow color The head is smooth and shining, with a projecting tubercle between th antennæ, which is hollowed on its upper side like the concavity of the bowl of a spoon, and from this hollow a wavy impressed line extends back to the base of the head. An elevated ridge margining the sockets of the antennæ has an impressed furrow on its outer side, in which on the under side are two black dots. The antennæ are tawny yellow, towards their tips black, their basal joint thick, cylindric, pale greenish yellow, with an oblique brown stripe on its under side. The thorax is rough from irregular elevated warts and ridges, and is crossed by two transverse grooves, in which and in the other indentations are several black dots and irregular spots. The wing covers are pale olive green, 2.40 long and 0.60 broad, widest in the middle and rounded at their tips, with a clear glassy spot on the inner base of each. The wings are smoky blackish with pale dull yellow veins and black veinlets and a very narrow pale hind border, and four rows of cells upon their outer margin are colorless and transparent but not clear and glassy. The four forward thighs have three rows of small brown spots towards their tips, the row upon their fore sides being longest, and on their under sides is a row of five small spines. The shanks have two rows of similar spines, of which there are about ten in the forward row and eight in the hind one. The hind thighs have a row of ten spines on their under side, and their shanks have on their outer sides two rows of spines, about fourteen in the inner and one less in the outer row, and on their inner sides two rows, the outer with thirteen and the inner with ten spines, all these spines being tipped with black. The individual is a male and was preserved in diluted alcohol.

The gigantic locusts of tropical America, of which as already stated there are four distinct species, are so similar to each other in size and in several of their most prominent and peculiar marks, that three of them were for a long time confounded together and were supposed to be but one or two species. Now that we come to possess a number of specimens taken together at one locality and see how alike these all are in their colors and other characters, it is evident that these insects are not subject to any material variations, and that the species into which they have been separated are well founded and are clearly distinct. They all pertain to the genus to which authors generally have given the name *Acrydium*, this genus differing from that to which the Migratory locust and most of our common grasshoppers in this country pertain, and to which the name *Locusta* most appropriately belongs, in having a spine or teat-like process hanging downwards in the middle of the breast between the haunches of the anterior pair of legs. These large species form a distinct group or section of that genus, differing from all the other species in having the thorax rough, with its anterior part elevated in the middle into a sharp-edged keel or crest which is cut across by three deep transverse furrows, dividing this crest into four lobes, as will be seen by a reference to the figures herewith presented, and the anterior end of this crest jutting forward in a point which projects over the base of the head. Their hind thighs also have two rows of white spots on their outer face, those of the upper row being commonly round and the others broad oval. In addition to this, three of these species further agree in having

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the wings spotted with black in a peculiar manner, as shown in the figure on plate iii, these spots having some resemblance to waves running from the body outwards and becoming more dense till they pass into a border which is totally black, upon the hind margin of the wings. The wing covers of these species also show faint spots forming obscure transverse bands. Agreeing with each other in these several marks, it is not surprising that these insects should have been regarded as forming but one or two species, the differences between them being imputed to a fading of particular specimens. The four species can be most readily distinguished from each other by the ground color of their wings. Their names and the colors alluded to are as follows :

The CRESTED LOCUST, *Acrydium cristatum*, Linn. Greenish blue.

The LEADER LOCUST, *A. Dux*, Drury. Brick red.

LATREILLE'S LOCUST, *A. Latreillei*, Perty. Pale yellow.

The HALF-RED LOCUST, *A. semirubrum*, Serville. Vermillion red, the outer half pale green.

The females are usually three and a half inches long in each of these species except the third, in which they measure from four to nearly four and a half inches. Their males are remarkably smaller, being but about half the size of the females. The Crested locust is the most common of all these gigantic locusts, occurring in abundance along the river Amazon and other parts of Brazil and in Cayenne. This has also received the name of White-legged locust (*albipes*) from Degeer. Authors usually state this species to be four inches in length, but my specimens received from M. Lacerda and others, each measure as above stated. All the insects of this family, however, vary in their size. The Leader locust inhabits the same countries with the Crested locust, and according to Drury it occurs at Honduras also. Indeed it is probable that each of these insects will be found in all the countries between the tropics. Latreille's locust has heretofore been known as occurring only along the Amazon and in other parts of Brazil, but the specimens gathered by Lieut. Van Rensselaer show that it is common at Panama also. Its width across the extended wings is from eight to nine and a half inches, its thorax being 0.60 wide and 0.80 high. Its four anterior legs are an inch and a half long and the hind pair 3.65 to 4.10, its antennæ 1.60. The specimens were preserved in diluted alcohol, and are of a pale dull yellow color. The figures herewit presented show the form of the several parts so distinctly that a detaile description is scarcely necessary. According to Stoll's figures the male is bu two and a half inches long with the colors brighter, and the wings of a rose-re tint bordered and spotted with black the same as the female. The Half-red locust has as yet been captured only in Cayenne. It differs from the other three species in having the wings destitute of a black border and spots. It was first made known by Stoll, under the name of the Yellow-horned locust (*flavicorne*), and this author appears to have regarded it as identical with a Chinese species, the Rose winged locust (*A. roseum*) of Degeer, subsequently named *flavicorne* in the works of Fabricius, Donovan, Serville and others. Hence Serville changed the name to that which it now bears.

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COUNTY ASSOCIATIONS.

The reports from the County Societies, of which abstracts are given, show, that the subject of Agriculture is receiving commendable attention in most of the counties of the State. In several of the counties from which reports have been received, it is to be regretted that more attention has not been given in securing reliable returns of the products of the county, and the improvements made in Agriculture.

The Secretary visited several counties, and delivered addresses to the farmers—and it was gratifying to be assured that agriculture is deemed of sufficient importance to secure the attention of many of the most intelligent men in our State. The manifest improvements in every section of the State visited, are indications of the advantages which have resulted from associated effort. Farmers are availing themselves of the information which is spread before them in the Transactions and agricultural journals of the day, and the superior manner in which farms are being managed, gives assurance that their opportunities have not been neglected.

An abstract of the census, so far as Agriculture is concerned, is given in the preceding pages. The year in which the census of the crops was taken, 1854, was a most unfortunate one, from the severe drought which prevailed throughout the State, affecting very seriously many of the crops. Still it will be seen that the resources of the State are most ample, and the general progress of the great agricultural interest is onward.

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ALBANY.

The annual fair of the Albany County Agricultural Society was held at Albany on the 23d, 24th, and 25th days of September last. The first and second days of the fair were rainy; and the entries, in consequence thereof, were not so numerous as they otherwise would have been, nor were the receipts as large.

The display of horses, cattle, sheep, swine and poultry, would compare favorably with the fair of 1855.

The manufacturers' department, household department, &c., were well filled, and the display was highly creditable to the county.

In the horticultural department, there was but little competition, although some fine specimens of fruit and flowers were presented.

On the whole, the fair passed off very pleasantly, and closed with an interesting and able address, from the Hon. Rufus W. Peckham, of Albany.

The receipts and disbursements are as follows:—

Cash on hand at last report,	$1,454 97
Cash from members at annual meeting,	154 00
Interest on money,	41 99
Receipts at Fair,	3,402 70
From other sources,	110 00
	$5,163 66
Disbursements,	4,750 14

Officers, 1857.—Joseph Hilton, President, New Scotland; C. W. Godard, Vice President, Albany; A. F. Chatfield, Sec'y, Albany; Luther Tucker, Treas. Albany.

L. G. TEN EYCK, *Treasurer & Sec'y.*

ALLEGANY.

The annual cattle show and fair of the Allegany County Agricultural Society was held at Angelica on the 30th day of September and 1st day of October, 1856—there was a large attendance and more interest than has ever before been manifested.

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The exhibition of cattle and sheep was not as good as usual, owing to short feed occasioned by the extreme drouth of summer.

The show of horses, matched and single, was large and fine; much admired by good judges.

The crops in the county (except corn) were generally very light in consequence of the dry weather. Corn was good. Some fine specimens of wheat and barley were presented; also of various kinds of vegetables.

The domestic articles were worthy of notice. The ladies, as usual, made a fine show of articles, which were the center of attraction under the tent.

Some cabinet furniture was presented, manufactured in Angelica, said to compare with any in the State.

The female horsewomanship on the second day, attracted the attention of the crowd and was generally applauded, (the utility of which is questionable.)

The funds of the Society:

Balance in hands of Treasurer, Jan. 1, 1856,	$60	71
Received from members,	160	00
" for use of tent,	82	81
	$303	52
Paid premiums and incidental expenses,	298	00
In Treasurer's hands, Jan. 1, 1857,	$5	52

Officers for 1857.—Richard Church, President, Angelica; James Lockhart, Treasurer, Angelica; E. M. Alba, Corresponding and Recording Secretary, Angelica—and six Vice-Presidents.

CATTARAUGUS.

This Society is a re-organization of the old Agricultural Society originally formed on the 11th of November, 1841. Under the old organization, for a period of about 13 years, the annual fairs met with indifferent success, and the interest in the Society—the interest of those classes for whose benefit it was created—was decidedly and uniformly cool. Occasionally, funds enough were received to pay premiums; but, generally, those interesting legacies—unpaid premiums, were transmitted from year to year, *legalis homo.*

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Within a few years a better feeling and increasing interest have manifestly prevailed; instead of the caricatures—furnishing food for jesters—of former years, our county fairs are becoming fixtures of decided interest; engaging alike the competing skill of the husbandman, the mechanic, horticulturists—amateurs and professional—and the ever-welcome, endless variety of useful and novel objects, wrought by the dextrous hands of the *fairest* contributors to the fair.

The law passed April 13, 1855, "to facilitate the forming of Agricultural and Horticultural Societies," under which the county Societies are generally reorganizing, plainly contemplated the permanent location of the Societies and fairs—a necessity to the success of fairs that has long been apparent to all conversant with the working of agricultural societies. Full authority to obtain and hold real and personal property sufficient for the use of societies was given in that act. Viewing the subject of a permanent location as vital to the future success of this Society, quite a spirited contest was had for the location, which resulted in the selection of Little Valley by a vote of 52, to 13 for Ellicottville and 7 for Gowanda; and at a subsequent meeting, after correspondence with various sections of the county, the location was fixed for ten years; a lot of 10 acres leased for that term near the village for $10, in full for the term. Substantial fences, yards, offices, &c., have been erected, and a carriage track, 80 rods in circumference, graded, and used at the last annual fair.

The annual fair was held on the 17th, 18th and 19th of September. It was decidedly successful in every thing but the tent exhibition. That was blown down twice by the severe gales that prevailed, with clouds of dust, so that the ladies' part of the fair was rendered comparatively of little interest, though ample arrangements had been made for a splendid exhibition on their part. The horse show in many respects was superior to any former one; and the cattle department was decidedly superior; some fine Short-horns were on the grounds, a few Ayrshires and some very superior Devons: among which were Molton, (351*,) Don Carlos, (346*,) and other good Devon bulls; †Strawberry, (1061*)

* Registered in Devon Herd Book, vol. 2.

† Strawberry, (1061,) thorough-bred and highly prized, owned by Messrs. Stanton & Johnson of Ellicottville, was found on the morning of the 23d Oct., 1856, with her left thigh bone broken. She was advanced to 266 days, (by Don Carlos, 346.) A skilful sur-

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and other cows, and some very fine, young full-bloods and grades.

The entries of working oxen, steers, grade cows, heifers and calves, sheep, swine and poultry, were probably superior to any previous show in quality and numbers. Owing to the destruction of the Society's large tent, the mechanical department was not so well presented as the contributions would warrant. The exhibition of fruit was light, but that of vegetables exceeded any former show.

Hon. John P. Hale, U. S. Senator from New Hampshire, delivered the annual address on the last day of the fair, which was listened to with profound attention by the vast assemblage; and the frequent rounds of applause of the audience was a spontaneous acknowledgment of the eloquent periods of this distinguished orator.

The following is a summary of the receipts and expenditures:

501 members,	$501 00
8 life members,	80 00
37 pedlers,	37 00
4 carriages,	1 00
2,460 single admissions,	307 50
State appropriation,	86 00
Rent of tent,	40 00
Cloth and iron sold,	9 66
Loans,	200 00
	$1,262 16
Expenditures,	1,233 81
	$28 35

Officers for 1857.—President, Horace Howe, Little Valley; Vice President, Lorenzo Stratton, Little Valley; Secretary, John Manley, Little Valley; Treasurer, Daniel Bucklin Little Valley; and six directors.

H. HOWE, *President.*

geon and an equally (in his line) skilful butcher were immediately procured; all arrangements made, chloroform was administered, and in 30 seconds, by the Cesarean operation, a bull calf was presented to Messrs. S. & J., and now (4 months old,) is a very fine animal, and destined, doubtless, to become famous under his name of MACDUFF.

☞ For article on Domesticated Elk, see ante p. 285.

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CAYUGA.

We have during the past year re-organized under the act of April 13, 1855, and contracted for the purchase of ten acres of land, adjoining the city on the west, and enclosed the same with a high substantial fence. Our land will cost us $150 per acre; is well located, with a stream of water passing through it, and we have graded a track of half a mile upon the premises.

The receipts of our last Fair was $2,266.44; and we have thus far realized from subscriptions, $894.50; and have pledges for about $1,000 or $1,200 more, by way of subscriptions, uncollected.

We have thus far expended for materials for enclosing the grounds, ... $1,091 16
For work and labor, ... 1,408 97
Premiums paid, ... 808 00
The cost of our Fair, ... 308 25
Solicit'g and collect'n of subscript'ns and other expen's, 343 98

When we commenced our new organization, we had a balance in the treasury of $585.15, in addition to which we borrowed $400.00, which has since been paid; and we feel we shall continue to prosper.

Officers:—President, T. H. Bentley, Weedsport; Vice-President, Oliver Wheeler, Auburn; Secretary, Horace S. Cook, do.; Treasurer, Henry H. Bostwick, do.

H. H. BOSTWICK, *Treasurer.*

CHAUTAUQUE.

The last Fair of the Chautauque County Agricultural Society, was a success without precedent in the twenty years' history of the Society.

Chautauque is in no Rip Van Winkle sleep, and the records place her by the side of her sister counties in no unenviable light.

Officers for 1857:—President, A. S. Moss, Fredonia; Secretary, Lorenzo Morris, do.; Treasurer, George Rood, do.

H. J. BLISS, *Secretary.*

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CHEMUNG.

During the past year a very large and commodious building has been erected by the Chemung County Agricultural Society, at a cost of $300, leaving a considerable debt against the Society. The building was erected at the village of Horseheads, (where the fairs were located for five years) previous to holding the annual fair. Notwithstanding this embarrassment, its action has been on a larger and more liberal scale than in previous years. Its annual fair, held on the 1st, 2nd, and 3rd of October, was attended by a very large concourse, though the weather was unfavorable during the first two days.

The exhibition of horses and cattle was very large, and of an excellent quality. The show of stallions was very fine and far excelled that of any previous fair held in this county. There were also on exhibition, some excellent specimens of one year old colts, and brood mares, and sucking colts. There was one brood mare and colt, owned by Hiram Vanduser, of Veteran, which cannot be beat in the State. Also a very fine show of matched and single horses. The show of cattle was very large and fine, and to give you some idea of the number presented for premiums, I will say, that there were over 150 entries on the first day of the fair. The show of milch cows far surpassed that of any previous year since the society had an existence in Chemung county.

The specimens of sheep were not very large, but of a very fine quality. They consisted of Merino, South-downs, grade and mixed bloods. The committee took much pride in saying, "that although the number was not large, those offered were of the very best quality." We can here say that our county is adapted to the raising of sheep, and we are glad to notice the interest that is manifested among the farmers of Chemung county, in that direction. This county has always sustained the enviable reputation of being one of the best butter making counties in the State, and the choice specimens of butter on exhibition at our annual fair, warrant us in saying, that she has lost none of her well-deserved fame.

The grain crops have not been very large, owing to its having been very dry in many localities. There were however some very fine samples of wheat, barley and oats.

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Wheat.—Horace Bennett, of Big Flats exhibited a very fine sample of winter wheat, said to have harvested 27½ bushels per acre. William Johnson of Big Flats, 25 bushels per acre; and John Ross of Horseheads, 23½ per acre.

Barley.—John Carpenter of Horseheads, harvested 48 bushels 2 quarts, from one acre and 22 rods.

Oats.—Matthew Staring of Horseheads, 71½ bushels per acre; Judah Rowley, of Big Flats 67¾ per acre.

There were also some very fine samples of clover seed; one by J. McConnel of Horseheads, one-quarter of an acre producing 4 bushels 5 quarts. Also one by William Johnson, of Big Flats, one-quarter acre producing 3½ bushels.

Plowing Match.—The plowing match came off on the forenoon of the second day, and an unusual interest was manifested. A very large concourse of people assembled to witness it, and it has been seldom, that we ever witnessed a better and more successful exhibition of the plowman's skill. The ladies' department displayed much taste.

The annual address was delivered in our new Floral hall, by the Rev. Dr. Murdock, of Elmira. It was one of the Doctor's very best, and was listened to by a large and attentive audience, who seemed to highly appreciate the importance of the subject.

Officers for 1857.—President, John N. Beers, Horseheads; Treasurer, Adam L. Staring, do.; Secretary, John F. Dean, do.; Corresponding Sec'y, L. H. Turner, do.—8 Vice Presidents, and 9 Directors.

JOHN F. DEAN, *Recording Sec'y.*

CHENANGO.

The Chenango County Agricultural Society, held its 11th annual Fair at Norwich, on the 24th and 25th days of September last. The attendance was good, and show fully equal to any previous one.

There were 728 entries made as competitors for premiums. The show of cattle and horses is not excelled any where, not even at the State Fairs. The other departments are in a flourishing condition.

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The receipts from all sources for the year was,.....	$1,014 83
Balance in treasurer's hands,.....	452 85
	$1,467 68
Paid premiums and expenses, 1856,.....	1,018 90
Balance in treasury, December 31st, 1856,.....	$448 78

The season has been a dry one, and many of the crops were seriously injured. Hay was fair, crop $\frac{1}{8}$ short; corn was short $\frac{1}{4}$; oats was short $\frac{1}{4}$; potatoes, a good crop, free from disease.

The staple products of the county are butter and cheese, which have been cut short some by the drought; it was nearly an average one, and commanded a good price. Butter from 20 to 25 cts. per lb.; cheese from 8 to 10 cts. per lb.

The farmers of the county are in a prosperous condition, and will continue so as long as the present price for their products is maintained.

We had a good address delivered by E. P. Smith, Esq., himself a good farmer and a practical man, and knows how to hold the plow.

The annual meeting of the Chenango county Agricultural Society was held at the court house in Norwich, on the 6th of January, 1857.

Mr. Wells submitted his annual report as treasurer, which showed the finances of the Society as above reported.

Officers of the Society for 1857:—President, Isaac Foote, Jr., Smyrna, and seven vice-presidents; Secretary and Treasurer, Jonathan Wells, Norwich.

The committee on grains awarded to Cyrus Hartwell of North Norwich, for the best acre of winter wheat, a premium of $5; 25 bushels per acre.

To Asa Harrington, of Sherburne, for the best spring wheat raised from one acre, (15 rods short), 33 bushels and 20 quarts of black sea, by measure, $5.

To J. G. Swift, of Sherburne, for the best acre of corn, $5.

To Ira Crain, of Sherburne, for best acre of oats, $4, and for the best half acre of potatoes, $4.

Accompanying the report of the committee, were statements showing in detail the modes of plowing, planting and cultiva-

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ting, practiced by the several gentlemen to whom premiums were awarded.

J. WELLS, *Sec'y and Treasurer.*

CLINTON.

The fair was held at the United States Barracks; the weather proved quite unfavorable, notwithstanding which, however, a very fair number were in attendance. The show of horses was very good and it is believed could hardly be surpassed by any county in the State. The Black Hawks were particularly conspicuous.

Of cattle, the show was good, although it is known that many choice herds in distant parts of the county were withheld on account of the unfavorable weather.

Of sheep and swine, the show was quite limited. Poultry, very few offered. Dairy, the show was limited but good. Fruit, very superior exhibition, one person showing 110 choice named varieties of apples, and another person 36 varieties of pears, together with smaller lots—and other varieties of fruits in less quantities.

Of flowers, some fine collections were offered. Of miscellaneous and domestic manufactures, farming implements, &c., &c., the show was moderately good.

The annual address was delivered by General Orville Clark, and was listened to with marked attention.

It is believed that the receipts of our fair would have been doubled, had we been favored with good weather.

The Treasurer's account shows remaining in his hands

at last report,		$28 31
Received from State Treasurer for 1855,		84 00
do do 1856,		84 00
do do special appropriation,		84 00
do members' cards and gate fees,		350 33
		$630 64
Paid premiums,	$417 00	
do expenses,	189 80	606 80
Balance,		$23 84

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The payment of a portion of our prizes in Transactions of the State Society and American Institute, and Agricultural, Horticultural and Mechanical publications has been found to work well and gives general satisfaction. There has been, it is true, fault found occasionally by persons whose only object in joining the society is to make money, and who take no interest whatever in its prosperity. The opinion of such persons is of little consequence. It is believed that the intelligent portion of the community appreciate the propriety of our course in this respect. In the payment of our prizes we have distributed the following:

Fifteen copies of the Country Gentleman; eighteen do. Rural New-Yorker; sixteen do. Horticulturist; two do. American Agriculturist; six do. Cultivator; five do. Genesee Farmer; one do. Plow, Loom and Anvil; one do. New England Farmer, (weekly)—sixty-four copies of periodicals for the year 1857. Twenty-five volumes Transactions.

The thanks of the society were voted to the Hon. Jefferson Davis, Secretary of War, and to Quartermaster General Jessup, for the use of the U. S. Barracks and grounds.

The annual meeting of the Executive Committee was held at the court house on the 18th December, at which several applications for premiums on field crops were presented, which were referred to a committee who reported that the statements were in every case insufficient to authorize them to award premiums thereon; this they regretted, as some of the crops were without doubt, deserving of premiums.

The terms on which the society offers its prizes on crops are, that the applicants shall furnish an accurate statement showing the character of the soil, its condition at the commencement of cultivation for the crop. The previous crop and cultivation and quantity of manure used thereon, and the kind and quality of manure and seed used the present season, the time and manner of putting in—cultivating and harvesting the crop—the amount of the crop, determined by actual weight or measurement and the expense of cultivation. To furnish these particulars correctly the farmer should keep an exact account with every crop as it progresses.—The object of the society is to induce a system of improved cultivation, and the statements required detailing the

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mode by which extraordinary crops are produced, being published by the society, the community have the benefit of it.

Officers for 1857—President, J. H. Sanborn, Plattsburgh; Secretary, John L. Stetson, do.; Treasurer, Edwin Benedict, do.; and 11 Vice Presidents.

JOHN W. BAILEY, *President.*

Plattsburgh, Dec. 24, 1856.

COLUMBIA.

The annual fair and cattle show of the Columbia County Agricultural Society was held at Chatham four corners, on the 24th, 25th and 26th days of September, 1856. The attendance was very large all through the fair. The exhibition was one of the best in all respects, ever held in old Columbia. The first day was devoted to the arrangement of the different kinds of stock and fancy articles; the show of cattle was on the first day. The second day we had a very spirited plowing match in the forenoon; and in the afternoon a very fine display of horses, both matched and single; also, the trial of speed horses. The third day was devoted to the display of fancy horses and female horsemanship. The show of farm implements was very fair. The fancy articles and home manufactures reflected great credit upon the fair contributors; too much praise cannot be awarded them.

That the farmers in the county feel a very great interest in this pleasant anniversary, was manifest by the large numbers that attended. The influence of such gatherings must be beneficial. It stimulates competition in the various modes of husbandry and production of crops, brings the people of different towns together to relate their experience, compare their stock, and kindles a generous enthusiasm and kindly neighborhood feeling among them. They gather new ideas and encouragements, and in turn impart them to others. On the whole, I believe and know the operations of the Society are diffusing a beneficial influence in the county.

The Society has purchased fifteen acres of land, and fenced the same with a durable fence, for the purpose of holding their annual fairs. We have built a very durable building upon the fair ground, one hundred feet long by forty wide, in which we show our fancy articles and vegetables; and we have a very fine

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half mile track to show our horses; and two rows of pens for the different kinds of stock, through the middle of our grounds. Our fair grounds are in the town of Ghent, about one-fourth of a mile from the village of Chatham four corners, or from the rail-road depot.

At the annual meeting of the Society, held on the 6th day of September, the Society re-organized under the statute of 1855, and the following gentlemen were elected officers of the society:

President, E. W. Bushnell, of Hillsdale, and five vice-presidents; Secretary, J. D. Shufelt, Ghent; Treasurer, L. D. Gifford, Chatham four corners.

The financial condition of our Society is as follows:

Receipts:

To amount received by subscription,	$852 00
To amount received on the days of the fair, of members and admission at gate,	1,681 57
In hands of treasurer at date of last report,	69 37
	$2,602 94

Expenditures:

To cash paid for premiums as per vouchers,	$512 00
To cash paid for the first payment of the fair grounds to Mr. Samuel Bullis,	800 00
To cash paid for building and fencing and preparing the fair grounds,	1,283 39
	$2,595 39
Balance in the hands of treasurer,	$7 55

The annual address was delivered to a large assemblage of farmers and farmers' sons and daughters, in our large building upon the fair ground, by M. Sanford, Esq., of Hudson.

ELISHA W. BUSHNELL, *President.*

Hillsdale, December 30, 1856.

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CORTLAND.

The Executive Committee met in April, and made out a premium list amounting to $700.

The eighteenth annual fair was held upon the grounds of the Society in Homer, on the 23d, 24th and 25th days of Sept. The weather was pleasant, with the exception of the morning of the second day, and everything passed off to the satisfaction of all parties.

The plowing match took place on the morning of the first day, the number of competitors was large. After the plowing, the members of the Society, with their wives and daughters, partook of a substantial dinner, prepared by L. Van Anden, and then adjourned to the Presbyterian church, and listened to a splendid poem by Lloyd Glover of Boston, followed by an off-hand, practical address by S. B. Woolworth, L.L. D.

The second day was wholly occupied by the general exhibition. The show of stock was considered superior to any previous one in the county; 210 head of cattle, 192 horses, 101 sheep were entered for premiums, besides many animals which were brought upon the ground merely for exhibition. Other departments were equally well represented.

The ladies' riding match came off on the morning of the third day. The manner in which the young ladies acquitted themselves was worthy of all praise. After the riding was the show of horses in harness, when, as a close, Mr. Glover repeated his poem, by special request, and the reports of the various committees were read.

The annual meeting was held in Cortland village, Dec 3d. For the premiums offered on field grain crops, no application was made.

Root Crop.—The Committee report but one application, and that by Moses Kinney of Truxton, who made the following statement:—The ground was sward; plowed in the fall; manured in the spring with rotted manure, ten loads on the piece; then cultivated and plowed shallow with a corn plow; then dragged and sowed about the first of June; hoed twice and harvested the first of November; three hundred bushels on sixty rods of ground, equal to eight hundred bushels per acre.

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Finances:

Balance in treasury from year 1855,	$486 09
Received from annual members and admission tickets to annual fair, 1856,	1,157 45
Received from Horace White (special premium,)	25 00
Received for rent of stand at fair,	25 00
Received for interest on loan,	22 52
	$1,716 06
Amount of premiums and expenses paid for year 1856,	711 09
Balance in treasury,	1,004 97

Officers for 1857.—President, A. S. Chamberlain, Homer; Secretary, S. E. Kingsley, Homer; Treasurer, Morgan L. Webb, Cortlandville; Corresponding Secretary, Chas. P. Beach, Homer; and four Vice-Presidents.

DELAWARE.

Delaware is one of those unfortunate counties which, though paying yearly a large sum for internal improvements in the State, has never been benefited to an amount equal to the money paid. It is true much money was loaned and lost by the State, while attempting to aid in the construction of the New-York and Erie railroad, designed for the benefit of this as well as other southern counties, yet the road as now located and completed does not benefit the inhabitants of the county as much as is generally believed throughout the State. It runs upon an extreme border; and a large share of our produce still finds its way to Catskill or Kingston, on the Hudson, in preference to Deposit or Hancock on the Erie road. The transportation of goods or produce, to or from New-York, to the central or northern part of the county, costs more than at Buffalo or Oswego. With all of these inconveniences the inhabitants of Delaware have prospered for the year past. The drouth of June and July seriously injured some of our crops, but as there was much more land sown and planted in the county than in years past, we shall be less dependent upon the importation of foreign flour and feed than usual. The season of 1854 taught us a lesson not easily forgotten. Instead of relying as at

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that time upon the produce of dairy for the purchase of bread, almost every farmer has raised his acre or two of wheat and corn, with rye, oats and buckwheat, as his wants have suggested. It is almost a universal expression with farmers, "I will try to raise my own bread as long as I have land to do it."

Dairying and raising stock is the main dependence of the county. There are some good flocks of sheep, but their numbers are yearly diminishing.

The amount of butter made the present year is probably somewhat short of the quantity made in 1855, with a slightly diminished price as compared with that year. Most of the butter has been sold in New-York, at from 23 to 26 cents per lb.

The Society held its fifteenth annual fair at the village of Walton, on the 24th and 25th of September. The concourse of people assembled was probably never equaled in the county. The ground enclosed for the exhibition contained nearly five acres, was well furnished with tents, buildings, pens, stalls, &c., and nearly every department filled with animals or articles for exhibition.

The total number of entries was 576, among which were 64 horses and colts, 207 head of cattle including 50 yoke of oxen and steers, each class containing superior animals of their kind, with a good show of the different breeds of sheep and swine; 13 entries in the dairy department; 79 of fruit and vegetables; 21 for sugar and honey of a quality seldom equaled, with the usual quantity of miscellaneous articles, many of them deserving a more special notice. The ladies' department was one of the most attractive in the exhibition. The articles were well arranged and a credit to those presenting them. There were 66 competitors for premiums, and $120 awarded, each drawing according to the merit of the articles exhibited, none drawing less than the amount paid for membership.

The fair closed with an address by the Hon. A. B. Dickinson, delivered in his usual forcible and impressive manner, containing much general and practical information and was listened to with interest by the thousands who were able to get within reach of his voice. The hearty cheering at the close manifested the spirit in which it was received. A copy of the address was requested for publication.

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A comparative view of the condition of the Society may be seen by a statement of the three last and most prosperous years.

1854, premiums paid, $359.00, leaving a debt of,..... $28 40
1855, " " $464.65, paid for tent $125, surplus 214 97
1856, " " $653.55, leaving now in treasury,. 380 58

The amount paid for premiums has been nearly doubled, and yet the funds are yearly increasing. The present prosperity of the Society may be in a great measure attributed to changing the location of the fair, from year to year. Its officers have ever been of the opinion that a permanent location of the fair would be detrimental to this or even the State Society.

Officers, 1857:—President, D. C. Thomas, Stamford; Treasurer, Hiram Olmstead, Walton; Secretary, T. B. Meigs, Delhi.

Finances:

Cash on hand, January 3, 1856,.....	$214 97
Cash from State,.....	106 00
Cash at fair,.....	628 60
Cash from citizens, Walton,.....	380 58
	$1,244 10
Paid premium expenses, 1855,.....	$11 02
Paid expenses, 1856,.....	224 10
Paid premiums, 1856,.....	628 40
Cash in treasury,.....	380 58
	$1,244 10

Grain and Root crop.

Spring wheat, E. Roe, 17½ bushels per acre; Spring wheat, L. Hanford, 16¾ do.; Corn, E. St. John, 76½ do.; Buckwheat, W. B. Hanford, 39½ do.; Potatoes, E. Olmstead, 294 do.; Potatoes, H. A. Rogers, 276 do.; Ruta baga, H. Olmstead, 382 half acre.

DUTCHESS.

This Society was formed in the year 1841. The farmers of the county were from the first highly interested in its welfare; for they thought they saw in it a means of improvement in agriculture. In this I think it may be said with safety, they have not been disappointed. They have given their money liberally, have

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attended the fairs, have exhibited their stock, their farming implements, their fruit, their flowers, the produce of their farms, the handiwork of their wives and daughters, in such profusion, that every exhibition of the Society, from first to the last, has been a complete success.

The last annual fair, held at Washington Hollow on the 23d and 24th of September, 1856, was no exception; on the contrary, the attendance and receipts were greater than ever before, and the exhibition itself was, in the whole, fully equal to any former one. In some respects it excelled, in others it fell short; but all were agreed that the articles shown at our fairs are improving in quality from year to year. All the animals of the last exhibition were evidently far superior to those of the first. The vegetables, grain, fruit, flowers, produce of dairy, farm implements, domestic manufactures and needle work, exceeded, in point of excellence and arrangement, that of any former one.

In the stock department, the number of cattle entered was as follows: Short-horns, 26; Devons, 3; Herefords, 1; Ayrshires, 7; native and cross-blood cattle, 35; working cattle, 46; fat cattle, 8; horses for all work, 69; thorough-bred horses, 2; jacks, 1; swine, 20; long-wooled sheep, 29; middle wool, 18; Merino, 16; Saxon, 17; cross blood and common, 19; fat sheep, 8. The Short-horns were considered very superior, many of them having been bred from the best imported animals. The farmers of the county have become thoroughly aroused to the importance of improvement in domestic animals, and Short-horn cattle seem to get a full share of their attention. It can be said with perfect safety that in no county of the Union has more money been expended for importation and improvement of Short-horn cattle than in this; not only men of wealth but many of moderate means are extensively and successfully engaged in this branch of agriculture. Other kinds of thorough-bred cattle are also receiving attention. Those exhibited were superior animals, but judging from the number entered, they are not so extensively bred as the Short-horns. The natives and cross breeds were also very good. Many farmers who have not the means or are not disposed to engage in breeding full-blooded stock, have, by a judicious system of crossing and good keeping, succeeded in rearing a race of animals far superior to those of twenty years since. The fat cattle, although not

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numerous, were good. Of working cattle there was a large number, all handsome, in fine condition, and some of them remarkably well trained; they were mostly native and grade cattle, but a few Devons. There was a fine display of horses, better than ever before, both as to numbers and quality. But few of them were raised in the county, but there was no lack of pride or interest in the noble animals, and they arrested the gaze and admiration of the thousands in attendance. The swine were also good, but the number was small. Of sheep there were about the usual number. For market sheep it would be impossible to say which was the favorite, the long or the middle-wooled. There was the greatest number of the former. Much attention has been given to these two breeds of sheep, and there are now many fine flocks of them in the county. For fine wools the Merino seem to be now taking the lead. The cross-breeds were also well represented, and many good animals were found among them.

The Hall was filled to overflowing with the finest of vegetables and grain, delicious fruits, beautiful boquets of flowers, arranged with much taste and skill; fancy needle-work, various articles of domestic manufacture, paintings, drawings, and many other things impossible to mention here—all showing the varied productions of the soil and the industry, skill and enterprise of its people.

The Society have extensive enclosed grounds, and, as it was thought at the time of erecting them, permanent buildings, of ample size, to hold all articles that might be presented for exhibition; but experience has proved them insufficient, and arrangements are now being made to enlarge them, and for erecting suitable sheds and stables to shelter all animals that may be on exhibition at any future fairs. These additions will undoubtedly be speedily made, when we may confidently look for still greater improvements in the condition of the Society.

Condition of the treasury:

Total amount received,	$1,327 54
Expenditures,	1,243 80
In hands of treasurer,	$83 74

Officers for 1857.—President, Daniel B. Haight, Dover Plains; a Vice President from each town; Treasurer, Richard T. Cornell, Clinton Corners; Secretary, George Sweet, Washington Hollow.

GEO. SWEET, *Secretary.*

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ERIE.

Officers for 1857.—Erastus Wallis, President, Willink; George W. Scott, Treasurer, Buffalo; James M. Payne, Secretary, East Aurora.

ESSEX.

Officers for 1857.—E. W. Rogers, President, Whallonsburgh; Samuel Hand, Secretary, Elizabethtown; W. W. Root, Treasurer, Elizabethtown.

FRANKLIN.

We are able to report that our prosperity is equal to that of former years. Premiums were offered by the Board of Managers amounting to $770.00, of which the Judges awarded $554.00.

The annual fair was held in the village of Malone, Sept. 24th, 25th and 26th, and notwithstanding that two State fairs were held near us, it was as well attended and as successful as any previous fair.

The number of entries was upwards of 600. Thirty yoke of fine oxen seemed to make the strongest impression of anything in the stock department.

There was a good display of horses among which were several spans well-matched.

The annual address was delivered by the Hon. Henry N. Brush, and was not unworthy of its author.

The lease of the ground which the society received free from Wm. Andrus, Esq., having nearly expired, the board deeming it essential to its future prosperity that it should own grounds on which permanent and convenient buildings could be erected, have purchased 10 acres of land for $1,000. The society will continue to add improvements in the way of buildings, shade trees, &c., and we hope to render it worthy of the object for which it was designed.

The annual meeting was held on the 8th of January, and the following officers elected for the ensuing year.

William Andrus, President; Samuel Man, Vice President; J. R. Seaver, Secretary; R. R. Stevens, Treasurer; Joseph Wilson, James G. Dickey, Directors.

D. R. SPERRY, *Secretary.*

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FULTON AND HAMILTON.

The Fulton and Hamilton County Agricultural Society held their annual fair and cattle show in the village of Johnstown, in the county of Fulton, on the 2d day of Oct., 1856.

The exhibition, under all the circumstances, was very creditable to the counties; the usual amount of interest appears to be manifested therein.

The receipts and disbursements of the Society were as follows:

Received—Cash on hand of last year,		$10 19
" raised by subscription,		97 00
" entry fees,		37 72
" of State Treasurer,		60 00
		$204 91
Paid—Cash for premiums awarded,	$172 25	
Expenses,	26 81	
		$199 06
Balance on hand,		$5 85

Officers for 1857.—President, Elisha Briggs, Johnstown; Vice-President, Isaiah Yauncy, Johnstown; Treasurer, Baltus Heagle, Johnstown; Secretary, Joseph W. Case, Johnstown.

D. CAMERON, *Secretary.*

GENESEE.

The first exhibition of the Genesee County Agricultural Society, under its new organization, took place Oct. 8th, 9th, and 10th. it attracted by far the largest gathering of people ever witnessed in this county on any similar occasion, and was in every respect highly successful, and reflected credit upon its officers. Visitors seemed pleased with the display, pleased with themselves and delighted with their neighbors.

The occasion was improved to compare the products of skill and labor, to gain valuable information, to exchange civilities, to form new acquaintances and to revive old friendship. The weather was most propitious, not a cloud obscuring the sky on either day, and the temperature of the atmosphere most favorable.

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The grounds of the society are situated on "Big-tree street," about one mile east of the village of Batavia, containing about twenty-one acres, well laid out, and most of it substantially fenced seven feet high. Within the enclosure is a fine course, half a mile in circumference, for the display of horsemanship, and the exhibition of horses for carriages and for the saddle. Every convenience which suggested itself to the officers in the way of affording facilities to visitors and exhibitors was placed at their disposal.

The display of cattle was fine, and in quality has certainly never been surpassed at any previous exhibition in this county. The display of horses was quite numerous, there being 117 different entries, and some of superior value and excellence. The show of sheep and swine was good.

The exhibition of agricultural implements was of the highest order, and creditable to the society and the exhibitors. The best show of agricultural implements by C. R. Brinkerhoff & Co. would vie with any exhibition in the State. The improved combined reaper and mower of Ketcham, and the self-holding plow invented by Mr. Brinkerhoff, always attract attention.

The ladies' fair took place within a mammoth tent, and included within it the exhibition of fruit, flowers, vegetables, the products of the dairy, articles of domestic manufacture, fancy articles of embroidery and needle work, paintings, drawings, &c. &c. This was one of the most important and attractive features of the exhibition. This display was abundant in quantity and superb in quality.

The show of mechanical arts was good.

The equestrian display by the ladies was a "brilliant and animating spectacle, and attracted the largest crowd which assembled during the fair." Seven ladies contested for the prizes, and the skill displayed was in "the highest degree decorous, and did not offend the taste or modesty of any person present. It was a beautiful display of horsemanship, showing the skill, intrepidity and womanly grace;" two of them were but ten and eleven years old.

The plowing match was quite exciting; there were fourteen competitors.

The fair closed with an able address by H. T. Brooks, Esq.

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Since the track has been prepared for the exhibition, and for training and testing the speed of horses, there never has been such an exhibition of trotting horses in this county. There were twenty-five horses in the several classes, competing for eleven prizes in the whole; and what was remarkable among so many drivers, there was no contention or unfairness, but all passed off agreeably, and was highly gratifying and satisfactory to the people who witnessed the exhibition of this department, so far as regards the display.

The aggregate amount received for tickets, at the gates and donations, was $3,473.20. The whole amount paid out for the land, for fencing and preparing the fair grounds and premiums was, $3,482.06. Notes on hand, $210.00.

At our first organization we numbered about 12 or 15 members; we now number between 700 and 800.

Officers for 1857.—President, C. E. Oviatt, Batavia; Vice Presidents, Nelson Parker, Elba, Leander Douglass, Stafford; Secretary Thomas Gates, Batavia; Treasurer, H. T. Cross, Batavia.

EDON FOSTER.

Batavia, Feb. 3, 1857.

JEFFERSON.

The annual fair was held at Watertown, September 17th and 18th, and was a very interesting one, showing the deep interest which is taken in the advancement of Agriculture, by the farmers of the county. The entries of animals 514, miscellaneous 446.

REPORT OF THE VIEWING COMMITTEE.

The viewing committee report that they have made the tour of the county, passing through the towns of Le Ray, Philadelphia, Wilna, Champion, Rutland, Rodman, Worth, Adams, Henderson and Watertown. Owing to the late day appointed for starting, and the limited time that could be devoted by your committee to the object, we have not been able in all cases to examine as thoroughly as we could have wished; but by dint of five days' hard riding, we have visited all the applicants save one. As this was in the extreme south-western part of the county, we could not reach it consistently with our private engagements. It has been to us a source of unfeigned pleasure thus to take a bird's-eye view of a considerable portion of the county; thus hastily to

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look in upon some of the best farms and gardens and dairies among us; and we take this occasion, on behalf of the Society, to tender our acknowledgments for the uniform kindness and courtesy with which we have been received, and the generous, cordial hospitality with which we have been entertained.

Our county, though suffering to some extent from drought, during a part of the summer, yet gives cheering evidence of general prosperity. The hay crop of the present season has not, as a whole, been exceeded for many years. It was probably mowed and secured in fine order. The butter and cheese dairies promise an abundant yield. Grain will, we think, prove a full average crop—all of which are selling at highly remunerative prices.

No long continued scorching drought, or grass-hopper scourge has passed with blighting influence over our fields, presaging distress and want and famine. The rain and dew and genial sunshine have not been withheld. The labors of the husbandman have been crowned with blessings, for which we ought to be devoutly grateful to the Great Giver of good.

The fair average crops and extreme prices of the past few years have added largely to the aggregate wealth of our farmers. Many by long industry have, in a legitimate farming business, amassed fortunes. Many others still have acquired an abundant competence, earned by hard labor and saved by strict economy.

Your committee were much pleased to observe in and about many of our farm houses an air of comfort and refinement—a paiseworthy ambition in the direction of improvement—an evidently increased attention to matters of taste in buildings, yards and fences. We passed some streets and neighborhoods that presented an aspect of rural beauty rarely equaled in any purely Agricultural country. How easily might these scenes of beauty be multiplied and reproduced at every corner. We think the farmers of Jefferson county can consistently, with a sound economy, afford to spend a little more of time and money in beautifying and embelishing their homes—in supplying their houses with books and papers—their grounds with trees and flowers and fruits, and whatever else may tend to make the old home farm a place of fond memories and beautiful associations—with whatever may tend to make farm life, not a ceaseless round of drudgery and toil of twelve to fifteen hours of incessant daily labor, but

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what it ought to be, an occupation not only healthful and ennobling, but pleasant and attractive to the young; not without its days and hours of recreation and leisure—of opportunities for moral and mental culture. Thus shall your children gather around you to love and honor the calling of their fathers.

Your Committee regret that so few farms were entered for premiums. Among those entered there are none which, in our judgment, are worthy of the first prize. So long as we have within our bounds numbers of farms every way worthy of the first premium, we are unwilling to award it to a farm falling in any respect short of a very high standard of excellence in thrift, cultivation and legitimate improvements.

We are sorry to say that in our travels we found no farmer who, by a general system of experiments, had developed facts decidedly new or interesting in agricultural science. We say carefully conducted experiments—experiments such as housing manure and proving its comparative value over that which goes through the usual leaching process—of saving and applying liquid manures, &c.,—of testing by experiment certain theories in reference to the manufacture and keeping qualities of butter and cheese.

What agricultural science needs, are facts and experiments in contradistinction to mere theories.

The farm to which we have awarded the second premium, Wm. P. Babcock, Champion, is finely situated along the base of the Champion hills—has a tasteful and substantial dwelling house, fronted by a beautiful grove of 25 acres, containing a sugar orchard of 500 to 700 trees. The dwelling house is what a farm house should be, of moderate size, simple and convenient in its arrangement, finished and painted throughout. The cellar is especially worthy of mention. It is divided into two large rooms, neatly plastered, and with a floor of solid cement, and seemed entirely free from those noisome vapors so common in underground rooms. The farm is largely provided with out-houses, such as cheese house, ashery, ice house, shop and tool house, horse barn, grain and cattle barns, &c., all in first-rate repair and neatly and tidily kept. It has a well kept garden and yard, and the grounds are remarkably free from the unsightly rubbish which is so apt to accumulate about a farmer's door. It is fenced with 280 rods post and rail fence, 680 rods stone wall, and the balance staked and

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capped, and all in good repair. There are 30 acres under the plow, 35 in meadow, 50 in pasture, and 25 in wood.

The usual crops are raised with a high average yield. From two to three tons of plaster are annually sown. Manny's mower and reaper is in use at an estimated saving of 33 per cent. Farm work is done with oxen and horses, and the farm is now stocked with young cattle. This farm has a light sandy soil, with a slight sprinkling of clay and subsoil of clay. It has a general appearance of thrift and high culture, and with some few improvements would in our judgment be entitled to the first prize.

We were very much pleased in this day of fast young men and fast horses, to hear the proprietor's son speak decidedly as he did in favor of oxen as an economical and convenient team for farm use. We endorse his sentiments most fully.

The farm to which we award the third premium, Hart Massey, Watertown, is situated one mile west of this village. It has a substantial stone farm house, with out-buildings and fences in a very fair state of repair. The soil is gravelly, with a mixture of clay, and gives evidence of systematic culture. The usual crops are raised with good yields. The owner has been remarkably successful in the cultivation of wheat, having raised 30 bushels winter wheat per acre the present season, and 30 bushels of spring wheat per acre for the last two years.

Farmers of Jefferson county, you certainly have among you first class farms and first class farmers—farms of high and clean culture from front to rear, with buildings and appendages in first rate order, with improvements worthy of notice and encouragement.

Your Committee have been called upon to visit only three. Can we not by some means have a little more of that competition which is the life of business?

The competition in butter and cheese is quite extensive. The dairies of butter examined, with one or two exceptions, are decidedly good, and several are in most respects very superior. The butter dairymen of this county need not be told that their butter ranks high among the best judges, and that it is very much sought for, especially for the Boston trade. It is undoubtedly true that our butter, as a whole, has been very much improved within the last few years; that is to say, there are many more first class dairies now than five years ago.

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Your Committee would be glad to be able to say that in their judgment there had been a corresponding advance in the quality of our first class dairies. These, though excellent in most respects, are certainly susceptible of improvement. Where we now find here and there a dairy that is entirely sweet, with no bad tubs or churnings, that as a whole is fit for family use, we ought to be able to find numbers.

It is entirely practicable in this climate, when butter is once properly manufactured, to keep it perfectly sweet and sound for an indefinite period. That this can be done is proved by the fact that we often find single packages thus kept, and sometimes whole dairies. A dairy thus manufactured and thus kept is just as good for fancy price as a nice lot of fall made butter. We suggest to our butter makers the propriety of experimenting in this direction, and especially that of trying a double set of packages made considerably larger, for the outside, the space between being filled with salt or pickle, somewhat after the California shipping style. These of course could be kept from year to year.

Several of the dairies examined by us, though otherwise excellent, are altogether too salt. The prevalent rule, one oz. to the lb., when the butter is washed and worked but once, and immediately packed, as is generally the case, makes the butter full salt enough.

Your committee think three-fourths to seven-eights of an oz. per lb., of pure rock salt, sufficient at all events. No more salt should be added than the butter will readily and entirely dissolve. More than this injures the flavor, and is of no possible benefit. We are perfectly aware that this is an old story to most of our dairymen, but your committee's experience convinces them that these remarks are not uncalled for.

The dairy to which we award the 1st premium, D. M. Todd, East Rodman, contains 11 cows—is washed and worked once only—salted three-fourths oz. Ashton salt per lb., and packed at once. The salt and butter are uniformly weighed. The cream is kept at a proper temperature by means of a cooler let down into the well. This dairy is not only well manufactured but beautifully kept, and gives evidence of being systematically, carefully and tidily managed. Average yield 135 lbs. per cow.

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The dairy to which is awarded the 2d premium, G. C. Parker, Rodman, is made very much like No. 1—is well manufactured, and is very high flavored—salted seven-eighths of an oz. per lb. during the hot weather—at other times three-fourths of an oz. only. Each churning is weighed, as is the salt, each time. Average yield 170 lbs. per cow. Too much cannot be said in praise of the system and care with which these two dairies are managed.

We award the 3d premium to a dairy of 27 cows, Jonathan Boynton, Rodman, and take pleasure in saying that, for so large a dairy, it is remarkably uniform and well kept, and gives evidence of the best of care, but it has an overdose of salt. But for this one defect, your committee would unanimously have given it the first prize. The yield of this dairy last year was 180 lbs. per cow, and has sometimes reached 200 lbs. per cow.

It may be well here to state that there were on the committee's list of applications, some who were noted as not having paid the fee of membership. This of course precludes the parties from the premium list.

The cheese dairies submitted for examination were generally good, and gave evidence of more than ordinary care and attention. Every dairy examined by us contained a large proportion of excellent cheese; yet in several there was an evident lack of uniformity, at once so difficult of attainment, and yet so desirable in a dairy of cheese. It seems in practice to be a matter of great difficulty so to manufacture and take care of a cheese dairy that it shall contain no poor or indifferent cheese. Some of those who have succeeded remarkably once, have fallen far short the next time and the next.

Many of our butter dairies have a reputation for excellence that has been well sustained for a series of years; and are often sold on this reputation, and are not often far behind the degree of excellency anticipated. This can be said of but few of our dairies of cheese. Hence we concluded that making fine cheese is an art not easily acquired—a trade that needs to be studied thoroughly and practiced long and patiently. We are satisfied that no set of rules will apply in all cases in the manufacture of cheese. Rules are no doubt necessary and useful, but need to be varied to suit variations of temperature, size of cheese and

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other circumstances, as experience and good judgment seem to dictate.

We notice that the rules by which many of our makers profess to be guided, are imperfectly understood; some claim to salt one common tea cup of salt to 15 lbs. curd; others, one cup to 20 lbs. curd, and others again, one cup of salt to 15 lbs. pressed cheese; and yet we found but very few dairymen who frequently and accurately weighed either salt or cheese, and on trial we found the common tea cup of salt to vary from five to eight ozs. While we totally repudiate the idea that a given set of rules should be adhered to in all cases, we are decidedly of the opinion that the common rules on the subject should be more precisely understood, and practiced with more discrimination. We think it would pay our cheese makers to use the Rock, or Syracuse evaporated salt, instead of the common barrel salt in so general use.

The dairy of cheese to which we award the first premium, Clift Eames, Rutland, contains 27 cows. The milking barn, dairy house and utensils are at once simple and convenient. It is scalded with whey, gradually, up to 100° to 110°, salted five ounces of salt to 20 pounds pressed cheese, and is put to press cold. Very great importance is attached by the maker to cooling the curd well before pressing, he being decidedly of the opinion that putting to press warm has a tendency to injure the flavor of the cheese. It is but just, however, to say that this theory is repudiated by other makers, perhaps equally good. We find every cheese in shape, in boxes, firm, but not too hard, and mild and uniform in flavor. Your committee were not sharp enough to detect in it the usual complement of indifferent cheese and were entirely unanimous in awarding it the first prize.

The 2d, G. W. Parker, Watertown; 3d, H. Hopkins and J. J. Evans, Rutland; 4th, D. Hamlin and E. Losee, Rutland, and indeed others to which no premiums are awarded, are prime dairies and each have so many good points that it is difficult to discriminate between them. There are some which we shall be glad to set down as No. 2, but we suppose a sound discretion will hardly admit of it, to say nothing of the rules of the Society.

Gentlemen, there are some mooted questions in agricultural science—some points about which well-informed men honestly

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differ—some fine theories, that are in their details too expensive or too fanciful to admit of their being carried into successful and profitable practice—some improvements, so called, that are hardly worthy of encouragement; but in reference to the general utility and immediate profit of dairying, combined of course with grain raising, there is but one opinion among intelligent men. For enriching and fertilizing the farm, it has all the advantages of growing stock, with the additional advantage of being more immediately and surely profitable. Neither can there be any question in reference to the utility and importance of getting up the best attainable quality. It may be true that buyers do not sufficiently discriminate, in point of price, between good and poor, and that not unfrequently buyers are found who give an extreme price for a poor article. But it may be well to remember that the reputation of the good often sells the poor in the neighborhood and that the competition and extra demand that furnish buyers of a poor article at good prices tend directly and powerfully to help the price of the whole, and that a prime dairy will always sell at fair rates, and at a time when a decidedly poor one is a drug at any price.

This Society has done much toward improving the quality of the butter and cheese in this county. We hope it may do more; and we sincerely hope that we may have succeeded in impressing upon the minds of our dairymen the fact, which some of them seem to ignore, that our first class dairies have not yet reached the best attainable quality—that they may be still further improved, both in manufacture and in the care and attention with which they are kept.

The kitchen garden to which we award the first premium, though small, we deem worthy of notice. We find it in a high state of cultivation, well laid out, entirely free from weeds, and containing within a small space an ample variety of the common fruits and vegetables of luxuriant growth; some of these were rare, and difficult of successful cultivation. It is located on what was once a barren rock—nearly 1000 loads of dirt and compost having been carted on to get the requisite depth of soil—every inch of space is occupied and we venture the assertion that more is realized from this small plot of ground, than is usually obtained from gardens of twice or thrice its size. We noticed some attention to flowers,

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and the garden entirely is cultivated by the owner, a man past the meridian of life.

The nursery to which we give the first premium contains a large variety of thrifty apple trees from one to five years from graft, also a variety of pears on native and dwarf stocks, also a fair variety of cherries, grapes, roots, &c.

The nursery to which is awarded the second prize, is larger and contains a variety of ornamental and shade, as well as fruit trees. The proprietor has a nursery in Ellisburgh, which your committee regret that they were not able to visit.

We bespeak for these nurseries a liberal patronage.

GENTLEMEN *of the Society:*

Permit me to congratulate you upon our success as a Society; that this Society has a strong hold upon the affections of the farmers of Jefferson county, is abundantly proved by the fact that our usual show is held now and here, notwithstanding the immediate proximity of the overshadowing organization of the Empire State.

This annual gala day, this gathering of all classes and ages from all parts of the county to do honor to agriculture, this annual exhibition of fine animals and choice productions of labor and the soil, we can hardly afford to lose. We choose to regard the time and money expended upon Agricultural Societies and fairs as a tribute to labor, a free offering in honor of Agriculture, in honor of free labor of freemen, of the free labor of sturdy farmers and farmers' sons, of thrifty housewives and robust daughters, cultivating habits of industry and usefulness, of sturdy independence, qualifying themselves alike for the highest walks of ease and wealth, or the more toilsome scenes of poverty and adversity; of the mechanic and the artizan whose handiwork in ten thousand forms of beauty, and utility, and convenience, to minister to our necessities, our comfort and happiness, and in honor of the labor of the pioneers of this county, the stalwart men who hewed down the gigantic forest that but a few years ago overspread the entire county—some of whom have now the proud satisfaction of seeing the neat farm house, the well cultivated field, the school house, and the village spire, where but, to them, a little while ago was the primeval forest, the wigwam and the council fire; of seeing this forest, its roots and branches, the

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growth of centuries, its rough and jagged surface, transformed by the hand of industry into the smooth and stoneless field and meadow, where the implements of the day, where the planter, the beautiful mower and reaper defraud the farmer of half his toil; some of whom, yet hale and vigorous, this day compete for your Society's premiums. We choose to contemplate these festive occasions as contributing largely to the innocent enjoyment of the people. We certainly have not too many holidays, we do not too much unbend from toil, care and business; but rather are we justly obnoxious to the charge of inordinate devotion to the pursuit of business and wealth, and to gross material tendencies.

These gala days, these scenes of social pleasure and utility, we cannot but regard as eminently suggestive of ideas of culture and refinement, the farmers of Jefferson county will not "willingly let die." This Society and these fairs have for their object the encouragement of that most noble and useful of all arts—the art of tilling the soil.

Annual meeting, January 14, 1857.

Winter crops.—Best winter wheat, 30 bu. per acre, Hart Massey, Watertown; best spring wheat, $30\frac{4}{10}$ bu., Ira Woodworth, Brownville; best potatoes, 296¼ bu. per acre, Joel Woodworth, Watertown; best carrots, 1,248 bu. per acre, W. W. Greene, Watertown; best corn, $75\frac{1}{8}$ bu. per acre, Wm. M. Coburn, Pamelia.

Receipts:

From J. C. Sterling, Esq., late Treasurer, cash,		$169 05
" " " plate,		20 62
For memberships previous to fair,		34 00
" and all sources during the fair,		608 08
From S. C. Lashar, per John Winslow, for license,		32 08
For memberships for 1857, received to day,		82 00
Receipts,		$949 75

Expenditures:

Premiums,	$629 00	
Expenses of fair, &c.,	266 53	
		$895 53
Balance in treasury,		$54 22

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Officers for 1857.—James Brodie, President, Rural Hill; Vice-Presidents, John C. Cooper, Wm. Rouse; Directors, Daniel Green, John M. Wilcox, M. B. Hunting, Moses Eames, Erastus S. Kelsey; A. P. Sigourney, Secretary, Watertown; W. Ives, Treasurer., do.

BENJAMIN MAXON, *President.*

LEWIS.

The annual fair of the Society was held in the village of Lowville, on the 17th and 18th of September, 1856. The morning of the first day seemed prophetic of an unfavorable time for the exhibition, but the weather soon proved favorable and vehicles of all descriptions came, laden with freight and the varied products of an enlightened and productive county.

The Agricultural interest manifested by our citizens on this occasion perhaps was equal to that on any other similar gathering. The zeal and energy of the leading members showed forth that their motto was "onward." The show of cattle and horses, &c., was not as large as on some former exhibitions, but noble specimens of each were out, to remind the citizen or stranger that Lewis can in these thinge vie with her sister counties; (considerable attention of late has been paid by the farmer to improving the blood of horses and cattle, and success thus far has crowned the effort, in horses particularly, for at the last State Fair the horses of Lewis county bore off many of the first premiums.) In the butter and cheese department she too is competing successfully with other counties—for quality and quantity is not surpassed by any other section of the State. The samples on exhibition were creditable indeed, and almost baffled the skill of good judges to discriminate which were entitled to the first honor. The ladies fair, too, had its attractions. The articles exhibited were not numerous, but bore the impress of elaborate skill and workmanship; the useful and ornamental, each arranged in tasteful order, presented a picture both pleasing and instructive to the beholder.

The plowing match in the forenoon of the 18th, was witnessed by a numerous throng in a field nearly three-fourths of a mile from the village. Not only did the spectators manifest great interest in the progress and event of the strife, but the plowmen and

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owners of teams seemed doubly animated and sensitive as to the result.

Immediately after the plowing followed the equestrianship by the ladies. The large circle upon which the riding and driving took place was densely surrounded by footmen and carriages filled to their utmost capacity. There being quite a competition in driving, it made this feature of the fair very interesting. The annual address was delivered by A. B. Sylvester, Esq., of Lowville, and was listened to by a numerous and attentive audience, who seemed well pleased and repaid for their convening. The speaker having been reared upon a farm was rightly fitted to give a good practical and instructive address, calculated to inspire the farmer to make constant effort to render his fields more productive, and elevate his vocation by scientific and systematic research and application. The discourse was characterized by practical knowledge, and sound sense.

The annual winter meeting of the Society was held at the village of Houseville, on the 23d day of December, 1856, and the following officers elected for the ensuing year:

President, Col. Edmund Baldwin, Turin, and six Vice-Presidents; Rec'g Sec'y, Mortimer Smith, Houseville; Cor'g Sec'y, Cornelius E. Stevens, Lowville; Treasurer, M. M. Smith, do.

MORTIMER SMITH, *Secretary*.

LIVINGSTON.

The President, Secretary and Treasurer of the Livingston County Agricultural Society, in obedience to the requirements of section nine of an act of the Legislature of the State of New-York, entitled "An act to facilitate the forming of Agricultural and Horticultural Societies," passed April 13, 1855, respectfully report that the following is a statement of the transactions of said Society for the year ending Dec. 31, 1856, viz:

The annual plowing match of said Society was held pursuant to notice on the 12th day of June, 1856; also, pursuant to notice the annual cattle show and fair of said Society was held on the grounds of the Society on the 23d and 24th days of Sept., 1856, and continued during two days. The amount of the receipts and

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expenditures of the Society for the year ending December 31st, 1856, is:

Receipts,	$1,705 71
Expenditures,	1,074 38

At the annual election of the officers of the Society for the year 1857, held at the Court House in Geneseo, on the 24th day of December, 1856, the following officers were duly elected for the year commencing January 1st, 1857, and ending December 31st, 1857:

Geo. W. Root, of York, President; H. E. Rochester, of Caledonia, Vice-President; Jas. S. Orton, of Geneseo, Secretary, E. R. Hammatt, of Geneseo, Treasurer; Wm. A. Mills, of Mt. Morris, and Jasper Barber, of Avon, Directors.

CHAS. JONES, *President.*
G. J. DAVIS, *Secretary.*
R. WHITNEY, *Treasurer.*

MADISON.

The Madison County Agricultural Society held its annual fair at Morrisville on the 8th, 9th and 10th of September, 1856. The weather was exceedingly fine, the attendance large, and the exhibition far superior to any previous one held by the Society.

The fair grounds comprise eight acres, substantially enclosed with a fence eight feet high—"Agricultural Hall," a large and substantial building, occupying the center. This Hall has two floors—the lower one for the exhibition of the products of the dairy, the garden and the orchard, and for the display of the larger articles of mechanism, the upper one for domestic manufactures, needle, shell, wax-work, painting, flowers, &c., &c.

Although it was too early in the season for mature vegetables and fruit, and the prizes offered for dairy products too small to insure such a competition as would do honor to a county so justly distinguished for its numerous, large and excellent dairies, yet in every department the exhibition was creditable, and in the more important ones, superior.

The competition for the numerous prizes offered for superior *fancy* and *farm* horses, was unusually spirited. Indeed, the primary source of enjoyment and pride of the farmer in the pursuit

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of his calling, seems to be in rearing fine horses. This is evident from the improved character of horses shown, and the great interest manifested to witness the performances in the horse ring.

It is in the display of cattle, however, that our county excels, and the "cattle show" of 1856 far exceeded any previous one of the Society since its organization in 1841. Nearly the entire herds of Short-horns belonging to Messrs. S. P. Chapman and Alpheus Morse, comprising some of the best stock in the State, were on exhibition, although but a portion of each herd was offered for premiums, having previously taken the first premium in the several classes.

This stock, with the very fine Devon herds of Baker & Son and John R. Chapman, form alone a very creditable show for a county Society; but from these several herds, and from other sources, the county has become well supplied with choice stock of all grades, from pure-blooded to all the various crosses. The rearing of such stock has become a settled source of profit to our farmers, and the lean, hyena-shaped racers, once so common, will soon become as rare as the moose in our forests.

Either from the influence exerted by Agricultural Societies, the increased demand for the products of our farms, or some other cause, there is a marked improvement in the agriculture of the county, and farms have not only steadily increased in price, but just as steadily in value and productiveness.

This county is second only to Otsego in the quantity of hops raised, the production of which, at times, has been exceedingly profitable, making the producer suddenly rich, yet the price fluctuates so much that those who are dependent upon the current profits of the farm for support are compelled to abandon their cultivation for that of crops of a more certain value.

A trial of mowing machines, under the direction of the Society, was had at Morrisville on the 2d day of July, 1856, which brought together a great number of the farmers of the county, eager to learn the relative merits of the various kinds of machines. The competition was shared in by the Allen, Manny and Ketchum machines. The Committee were called upon to decide eleven points—three of which were decided in favor of Allen's, two in favor of Manny's, two in favor of Ketchum's, two equal between

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Manny's and Allen's, one equal between Manny's and Ketchum's, and one not tested.

The receipts of the Society for the year 1856, have been as follows:

Amount received from State appropriation,		$120 00
"	" C. D. Miller,	5 00
"	" annual memberships,	325 00
"	" rent of fair ground to pedlars,	50 00
"	at gate at annual fair for admissions,	416 60
Total amount of receipts		$916 60
Premiums and expenditures,		$928 18

mmu

List of Premiums.—Spring wheat, R. S. Ransom, 25 bu. 2 lbs. per acre; Corn, E. Richardson, 81¾ bu. per acre; Potatoes, L. Brown, 342 bu. per acre.

Officers for 1857.—President, John R. Chapman, Sullivan; Treasurer, L. D. Dana, Morrisville; Secretary, Lucius P. Clark, Morrisville.

MONROE.

The Monroe County Agricultural Society have, during the past season, secured a permanent location of their fair grounds, and as our success has been unexampled in our own history, and fully equal to our most sanguine expectations, I send you a somewhat fuller statement of our proceeding than might otherwise be necessary.

Our Society has pursued the usual course adopted by Agricultural Societies generally, viz.: holding fairs in different locations, sometimes endeavoring to arouse a spirit of emulation by holding the fair where the greatest number of members were offered, and once by holding two fairs in one year in different portions of the county, &c., &c. But all the means used seemed to fail in one respect; *we did not get ahead any*—we did manage to keep out of debt, but the interest in the Society among the farmers seemed to be rather at a low ebb. At its annual meeting in January, 1855, the Society appointed a committee to investigate the subject of permanent location of fair ground, and report at the next annual

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meeting. At the annual meeting in January, 1856, this committee made an elaborate report, reviewing the whole subject, and showing by the history and progress of those Societies throughout the State, in every instance where a permanent location had been made, that good results had followed, and took very decided ground in favor of adopting the plan in this Society. The views of the committee were indorsed by the Society, and immediate measures taken to secure the end proposed. A committee was appointed to select a suitable site for the grounds, and committees of finance in each town to raise subscriptions of life-memberships, at $10 each, to furnish the necessary funds.

The idea seemed to infuse a new life into the members—it struck every one favorably that the Society should have a home of its own. It required no peculiar power of reasoning to convince people that once located near a city like Rochester, of 50,000 inhabitants, it would be a self-sustaining institution—that thousands would be ready to pay a shilling to gratify the eye with seeing what they never would give a dollar to encourage as simply a *good institution* for progress and reform. A few of the towns responded handsomely to the call for funds; Brighton subscribing and paying about $1,200, in life-memberships; Henrietta about $500; Rochester about $2,000, and in all about $5,000 were subscribed. In the greater number of towns, however, no subscriptions for life-memberships were made, a difference of opinion about the proposed location in some cases operating rather injuriously. The funds were mainly contributed by the city and towns adjoining and nearest to the location finally bought. Meetings of the Society were held from time to time, to hear the reports of different committees engaged, and a good degree of interest was manifested in the result. In March, 1856, we reorganized under the law of 1855, and in April the Board of Managers selected the present location, which is near the center of the county, about two miles south of the city of Rochester, near to Mount Hope cemetery, and at sufficient elevation to give a commanding view of the county buildings and the surrounding country. The grounds contain nearly twenty-five acres, and are peculiarly well adopted to the purpose. The price paid for the land was $4,000. The whole has been enclosed with a substantial tight board fence, eight feet high, picketed upon the top, with a

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business office 50 by 30 feet, of neat and tasteful construction, near the entrance. The buildings and fence next the road are painted in a manner to give the whole a pleasant and attractive appearance. We intend to erect other buildings soon. A track for horses to exhibit is laid out, one half mile in length, with suitable guards, &c., the two sides being straight, with a semi-circle on each end, which form is thought to be better than an ellipse or a circle. We have water in abundance from two wells, dug and stoned the present year.

Our expenses we estimate in round numbers as follows:

Cost of land,	$4,000 00
Cost of fences and improvements,	1,800 00
Amount of premiums paid,	1,200 00
Total,	$7,000 00

Our premium list this year was increased from the old plan of $400 or $500 to $1,500. Our liberality was appreciated by the farmers, and perhaps also the excellent facilities afforded for keeping, watering and feeding stock had some effect in drawing out competitors, for in this department especially, as well as most others, the fair surpassed any of its predecessors.

The whole number of entries was 1,163; number of entries of horses (of which 20 were matched horses, and 14 mares and colts), 220; of cattle, 151; of sheep, swine and poultry, 97; of plowing implements and machinery, 112; of fine arts and general manufactures, 53; of domestic manufactures, 221; of grain, dairy produce and vegetables, 202; of fruits and flowers and miscellaneous, 97.

The show of horses was not only large but embraced many animals of superior merit, and possessing the different requisites of speed, strength and symmetry, showing that our best horses were not as has been heretofore observed, "*all sent to market*," this year. It shows also that much has been done in this county towards improving our breed of farm horses, although it is doubtless true that indifferent and even poor horses are still the most numerous. The show of horses was perhaps the main feature of the exhibition, but was not permitted to detract from other departments equally important, especially with respect to those horses which are shown for speed and

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symmetry. Our object has been to secure just so much of such performances as will add an attractive feature to the show, by bringing out this class of animals, without degenerating to the sports of the turf.

A larger number than usual of Durham and Devonshire cattle were exhibited. The Herefords, Ayrshire and other imported breeds not being kept very generally, if at all, in this county. As most of our cattle are natives and grades, the greater part of those exhibited were of this class, and were for the most part unusually fine. As the cultivation of wheat is diminishing among us it is thought that increased attention and skill, directed to cattle raising, would be beneficial in renovating the soil and preparing it by a change of crops to produce better wheat, when the time for raising it shall come again.

Of sheep the show was more than respectable, and consisted of the different varieties of Spanish and French Merino and Saxony for fine wool, and a good collection of South Downs. There were a few of the improved breeds of Cotswolds and Leicestershire, but not so many as their excellence would make desirable, nor so many as our farmers will find it for their interest to raise, when they know their good qualities better.

Swine were out in greater numbers than ever before, and many choice specimens were shown. The Suffolk appears to be the favorite breed.

The poultry showed rather a falling off from previous years. The "fever" has somewhat abated in this vicinity. Our farm implements, &c., were on the ground in good order.

Many fine samples of wheat and other grain were exhibited. This department has been neglected in previous years, no premiums having been offered, which, in a county famous for grain producing, was a little singular. The samples offered this year excited a good deal of interest, and this department will doubtless be still further encouraged.

Butter was good and plenty, but no cheese of any consequence was offered; there is none made for market in this county. The vegetable world was well represented.

Among the new articles were specimens of "English Fluke" or "Biscuit Potato," so called by the exhibitor, resembling the Mexican, but larger and said to produce much better.

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In domestic manufactures specimens were abundant and well wrought; never better at any previous fair in this county.

Fine Arts and General Manufactures.—The liberal premiums offered brought out a good degree of taste in the several departments.

Fruits and Flowers.—The American Pomological Convention being held in this city at the same time with our fair, took off the attention of our professional and many of our amateur fruit and flower men, so that this, although quite creditable, was in proportion to what it might and should have been the least commendable of any part of the exhibition.

Female Equestrianship.—The first trial of this display was made this year, and $75 offered in premiums; the consequence was that an immense crowd collected to see the performance, adding materially to our receipts, which we estimate in round numbers as follows:

Collections for life-memberships, in all the past year, $10 each, say,	$3,500 00
Annual memberships, $1.00 each, say,	1,200 00
Shilling tickets of admission,	1,300 00
	$6,000 00
Add to this for subscriptions not collected,	1,000 00
	$7,000 00
Total expenses, as above,	7,000 00

We expect to collect the $1,000, subscribed and not collected, previous to the next annual fair. If so, we shall have bought and paid for our location and improvements the first year, which is better than farmers generally are in the habit of doing individually, and quite as well as we could expect, taking the results attained in other counties as a standard.

The annual address was delivered by Hon. Washington Hunt, an abstract of which is annexed.

The results that have followed from permanently locating our fair grounds, are sufficient to prove to us the wisdom of the measure, and although it met with opposition, and was not secured without strenuous exertions on the part of the officers, I do not believe that a man of ordinary intelligence can be found in the county who does not approve of the plan; and we can say with

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confidence to all those Societies who are considering the subject: go forward and the good sense of the community will sustain you. As one inducement for Agricultural Societies to hold land for permanent show grounds, the Legislature, at its last session passed a law, at the instance of the officers of this Society, to exempt such land from taxation, so long as held for that purpose.

WILLARD HODGES, *President.*

ADDRESS.

Gov. Hunt apologised to the Society for his inability to prepare a written address. After accepting the invitation of the President to appear on this occasion, other engagements had occupied his time, and he was compelled to speak without the study and preparation which he would have desired, and which he considered due to the importance of the subject he intended to discuss. He then proceeded to address the Society, and presented a clear exposition of the value and dignity of the agricultural pursuit, in its various aspects and relations. In this connection he traced the moral, intellectual and social condition of the human family, through its successive graduations, from the hunter state to the advanced position that has been reached in modern times, through a wise appropriation, subdivision and cultivation of the soil, upon principles which secure to man the best gifts of nature, as the reward for his industry. In this review it was demonstrated that agriculture is the primary source, not only of the public wealth and prosperity, but of social progress and civilization; that the cultivation of the earth is the pursuit most favorable to the harmonious development of the intellectual faculties; most congenial to the diffusion and sway of pure moral influences. The investigation of nature's laws, as unfolded by the physical sciences and illustrated in the daily experience of the husbandman, imparts vigor and activity to the mind, while the wonderful bounties of the Creator, displayed in all the operations of the vegetable and animal kingdoms, can scarcely fail to warm the heart and inspire exalted sentiments of religious devotion.

In support of the proposition that agricultural communities are the chosen abode of the family and domestic virtues, a comparison was drawn between the engrossing cares, the artificial excitements and intense passion for gain, which affects the social condition of our large cities, and the moderate desires, the calm

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tranquility and rational contentment which lend an attractive charm to the shades of rural retirement.

Gov. Hunt then proceeded to consider the relations between agriculture and other departments of human industry. He contended that the various pursuits of labor, instead of being hostile and antagonistic, are in truth harmonious and mutually beneficial. Commerce and manufactures wait upon agriculture as servants and auxiliaries, contributing in a thousand ways to its improvement and productiveness. The mechanical skill which provides the farmer with more perfect instruments, arms him with new strength and capacity for his daily conflict. Those who "go down to sea in ships" invigorate agricultural industry by imparting an extra value to the productions of the soil. They promote the comfort and refinement of the rural population, by placing within its reach the inventions of art, and the diversified fruits of the earth, from every clime. All other interests are subordinate to the agricultural; from its prosperity they derive their vitality and support. Its advancement contributes to their growth and expansion.

He then dwelt at some length upon the superior importance of agriculture in its relations to the State. As the principal fountain of all wealth, public and private, and the only sure basis of mercantile and manufacturing enterprise, it deserves a prominent place in the regards of the statesman. The subdivision of the soil into moderate parcels, and its careful cultivation by intelligent and independent proprietors, are closely related to the strength and durability of a republic. All history proves that a virtuous yeomanry, composed of intelligent freeholders, constitute the surest guardians of liberty, and the most faithful supporters of law. An agricultural population thus constituted will cherish the spirit of freedom, and preserve that purity of patriotism which withstands the encroachments of power, and the seductive approaches of political corruption. Our country may justly claim to possess a class of farmers, superior to any similar class in other parts of the world, both in point of intelligence and personal independence. While ownership imparts a spirit of independence to our rural population, and our system of education fits them for the exercise of political responsibilities, our republican institutions will rest on a firm and secure foundation.

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This will always prove the safest reliance for the preservation of free representative government.

In the next place Gov. Hunt discussed briefly the peculiar advantages of country life, for an orderly development of the intellectual powers and moral qualities which, in harmonious combination, create the noblest character attainable by man, until his mortal nature shall have "put on immortality."

In conclusion he congratulated the society upon its success in having permanently secured the beautiful and commodious grounds upon which the fair was held, and which is now dedicated to its future uses. It was in all respects fit and proper that the agricultural society of such a county as Monroe should become the proprietor of land and buildings, suitable for the annual exhibition of its progress in improvement, convenient for comparing the varied productions of industry, and for displaying the wonderful bounties of nature, manifested in the golden fruits and the specimens of animal strength and beauty, which greet the eye on every side.

The location and the arrangements, so creditable to the society, excited his warmest admiration. The farmers of Monroe had presented a noble example to their neighbors, and he expressed the hope that it might be imitated by his own, and all the counties in Western New-York.

MONTGOMERY.

The annual fair and exhibition of the Montgomery County Agricultural Society was held at Canajoharie village on the 25th and 26th days of September, 1856.

The fair grounds and other arrangements for the accommodation of exhibitors and spectators, got up by the officers, with the aid of the citizens generally, were all in excellent order, and the number in attendance, especially on the first day, which was devoted to the exhibition of stock, was unusually large.

The exhibition of stock was very respectable in quality, but not as good as should be from a county like Montgomery; and in numbers we had more than at any annual fair for several years; and I regret very much to be compelled to say that a county that has as many wealthy farmers as ours, and who can produce

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some as good native stock as any other county, should be so regardless of the improvement of their neighbors' stock, and I fear in many instances remain at home to leave their stock for the simple reason that it don't pay to take it to the fair.

One principal reason also, that our exhibitions are not what they should be, is the feeling manifested by many towns and individuals because the fair cannot be located every year to suit their convenience or wishes; thereby compelling the officers and citizens where the fair is located not only to make the arrangements necessary, but to produce the greater portion of articles for exhibition, in order to make even a respectable show. Such things are very much to be regretted, but I am sorry to say, that in this county they cannot be denied.

The exhibition of fruit and vegetables was highly respectable. The display of manufactured articles—especially the ladies' department, was excellent, and from the quantity and quality of their articles, on exhibition, it evidently shows that they have a greater interest in keeping up a respectable show, than very many of the other sex.

The afternoon of the second day was devoted principally to the plowing match, which excited considerable interest; and the plowing done, evidently showed that the plowmen understood their work.

Officers for 1857.—Andrew J. Yates of Glen, President; R. H. Cushing, Mohawk, Secretary; Edward Walter, Palatine, Treasurer.

STATEMENT OF BENJAMIN J. NELLIS.

Oats.—There were four acres in the field from which the acre hereinafter stated was taken, and was the fifth spring crop for five successive years. Three first crops were oats, the fourth buckwheat. It was fall plowed and plowed in the spring. Two and one-quarter bushels were sown to the acre. Land has not been manured for the last twenty years; black sandy soil. The expense of harvesting and thrashing $1.87½ per acre.

One acre, strict measurement, produced sixty-three bushels and twelve quarts, and weighed 36 pounds per bushel.

Corn.—There were six acres in the field; the lot has been used as a pasture for the past eight years; no manure or plaster used; plowed this spring, sod turned over; black sandy soil.

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One acre, strict measurement, produced 163¾ bushels in the ear. The cost of harvesting, about $3 per acre.

WILLIAM KNOX, *President.*

C. S. BRUMLEY. *Secretary.*

NIAGARA.

Our fair was held in the village of Lockport, on the 9th and 10th days of October, 1856. The exhibition of neat cattle, horses, sheep, swine, agricultural products, domestic manufactures, &c., &c., was very large, surpassing any previous fair.

Finances:

Cash on hand from last year,	$98 15
Received at fair,	756 20
	854 35
Paid premiums and expenses,	728 21
On hand,	$126 14

Officers for 1857.—James D. Shuler, President, Lockport; 12 Vice Presidents; R. Sears, Secretary, Lockport; John Van Horn, Treasurer, Lockport; and 6 directors.

DANIEL MORSE, *Secretary.*

ONEIDA.

Annual fair, Sept. 23d, to 25th, at Rome, was well attended. The exhibition in most departments was not inferior to any former ones. The display of cattle good; of horses, superior to any previous exhibition. The address by Hon. Horace Greeley, was well received, and a copy solicited for publication.

Officers for 1857.—Calvin Bishop, President, Verona; S. A. Bunce, Secretary, Vernon; James Rees, Treasurer, Utica.

ONTARIO.

The annual winter meeting of the Ontario County Agricultural Society, was held at Canandaigua, on the 4th of February, ult.,

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and as that date closed the working year of the society I submit the following report of operations.

Early in the spring of 1856 strenuous exertions were made to provide funds for the construction of a covered amphitheater for the use of the society. By thorough canvass of the county, a sufficient number of Life Members were obtained to justify the building committee in proceeding with the work. Proposals were thereupon issued for contracts to erect the same, and contracts were entered into for the work. Ground was broken in the month of May; the mason work was finished by the middle of June, when the carpenters commenced their part of the contract, and early in September they gave the society possession of the building. The amphitheater is 660 feet in circumference, and 210 feet in diameter, and 32 feet high. It has an exhibition room on the lower floor 640 feet by 20 feet wide, has in addition on second floor, 900 feet of tables, three feet wide, with an open circle in center of the building 150 feet in diameter.

For the information of those who contemplate a like structure, these items are given, with the assurance that so far as Ontario county has experimented the thing has been an entire success, and it is hoped that the enjoyment and pleasure we have derived may by its example induce others to do likewise.

The exhibition days of last fall were gala days of rare and unusual enjoyment, and never has there been an occasion when the county gave itself more entirely up to the pleasure of this farmer's festival. The three days were of unusual autumnal beauty, and the throngs on the ground, seemed as much gratified by the agricultural treat so pleasantly and so systematically provided.

The show of blooded cattle was brilliant, exceeding anything ever before witnessed at a county exhibition. The display of horses, in all grades and classes was very large, and worth many miles of journey to see. While numerous and well-filled pens of sheep and swine, with tables loaded with vegetables, and productions of the garden and orchard, gave some token that our farmers had put their hearts in the work; the women of the county also by their contributions of needle work, and household products, added their full share to the attractions of the scene.

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By arrangement the various prize cattle, horses, &c. were exhibited in the center of the amphitheater, as their awards were announced; while the surrounding benches, rising one above another, crowded with the well-dressed and orderly families of the farmer citizen—thus enabled to witness a show of rare excellence and attraction, in a way perfectly safe, and without the fatigue and exposure usually attendant upon such display, was an ample reward for the exertions of the society.

The third day was mostly devoted to a new feature in our county, being a sweepstakes exhibition for premiums of a considerable amount, open for all competitors. The result was most satisfactory. Early in the day the grounds were filled, and by noon not less than fifteen thousand people were present. The amphitheater was crowded to its utmost capacity, and its large circumference was overloaded; not less than four thousand people found seats, and half as many more were standing on every spot offering a foothold. At one hour the circle would contain the horned cattle drawn from far and near, their sleek and well-trimmed proportions offering fair points for admiration. Then the robust bulls, their whole bearing indicating all that is so peculiarly characteristic of strength and ferocity, subdued by the intellect of man, stood awaiting the awards of the judges; and it required no great stretch of imagination to carry the mind to stories of Spain and her national pastime. And when they gave place to the various classes of horses, the fierce prancing stud, as well as the gay roadster, the mind could as readily recall the equestrian traditions of Rome.

To shew that the enterprise of the Society has been productive, it is only necessary to add, that the receipts for

1855 were,	$2,355 20
1856, "	7,780 47
Increase,	$5,425 27

At the close of the display of cattle, Professor Mapes of New Jersey, delivered a short and appropriate address on topics connected with the progress of agriculture, but the crowd was too large for the mass to hear, and but a few hundred who congregated immediately about the platform could derive any advantage. Such as were happy to obtain places within reach of the voice

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of the Professor, gave every token that his remarks were good and well appreciated.

The total number of entries for exhibition were 1,184, of which 800 were stock and the balance the various farm and household products connected with agriculture.

Receipts:

521 life members, $10,.....	$5,210 00
Donations,.....	200 00
702 annual members,.....	701 00
Receipts at gate, (12½c. tickets,).....	1,216 40
Entries for sweepstakes,.....	165 00
Stone sold,.....	10 00
Balance of last year,.....	186 07
	$7,780 47

Liabilties and Expenditures:

Paid Edgecomb & Garfield, extra on amphitheater,	$7,063 08
Paid mason work, labor, &c.,.....	1,665 88
" Grading track and grounds,.....	501 01
" Premiums, Sept., 1856,.....	1,052 50
" Premiums, Feb., 1856,.....	98 00
	$10,380 47

The business of our winter meeting was confined to the award of premiums for seed and field crops and farms, and the election of officers for the year. As nothing of novelty or of much importance was elicited in relation to the cultivation of the products taking premiums, I close this part of my report with the following extracts from statement of Mr. Metcalf, to whom was awarded the first premium on farms:

"My farm is situated in the town of Gorham, half a mile south of Reed's Corners. It was originally covered with heavy timber of oak, maple, elm, basswood, ash and some hickory; the principal timber, however, was oak. I purchased said farm April 1, 1850; it contained 128 acres, at $50 per acre. Previous to my coming in possession, it had been rented for five years by E. Godard, who practiced the skinning system of farming. There were 80 acres of stubble, and not one foot seeded to clover on the whole farm when I took possession, (April 1, 1850.) I contrac-

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ted a debt for said farm of $4,000 My personal property consisted of 1 yoke of oxen, 1 span of horses, 2 cows, 1 two year old heifer, 18 sheep, 1 pig, 2 plows, 1 harrow, 1 wagon, and a wheel cultivator. I had the admonition from my father (an old and experienced farmer,) that I never could pay the interest of said debt off said farm; but with my management I have been able to pay the interest and all the principal with the products of the farm in this year. I have purchased 28 acres adjoining on the south side of my farm, at $55 per acre, over one-third of which I have paid the past year, besides increasing my personal property three fold.

To the questions of the Society, which are indicated by the replies, Mr. Metcalf says:

"Soil clay loam, subsoil clay. By sowing Cayuga plaster on all my land where wheat, barley and oats are sowed, at the rate of one and a half bushels per acre, and using all the manure made on the farm, my farm is best improved. I plow from five to eight inches deep. Deep plowing has produced the best wheat and barley—shallow, with coarse manure plowed under, the best corn. Have not used subsoil plow. Have laid 100 rods of blind drain 3 feet deep, with stone mostly. The increase of barley and wheat has been nearly doubled by it, but the land drained was the wettest part of the field.

About 300 loads of manure are manufactured annually from hay, corn fodder and straw fed in the yard and stables. Horse and cattle manure is mixed daily with the straw in the yard. I apply about 20 loads of coarse manure to the acre for corn, if the land has been much cropped. I prefer clover sod for planting corn. The remainder is composted for wheat in the fall. After preparing the land for wheat, I spread the manure on and drag it in, which I think is the best way it can be applied to the wheat crop. Have used plaster, guano and unleached ashes for wheat; sowed 300 lbs. guano broadcast on three acres of wheat 1st. Dec., '55, and the balance of the field (20 acres) with Cayuga plaster and unleached ashes. I could see no difference in the guanoed part from the rest of the field. I believe Cayuga plaster and ashes increase my crops of grain and clover ½ per acre. Have not used salt or lime. Two bushels of seed wheat are sown per acre with Foster & Jessup's grain drill, say from the 1st to the

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9th of Sept. My corn is grown on clover lay of one or two year's growth; plowed once just before planting, harrowed and marked out 3½ feet each way; planted between 9th and 17th of May with 8 quarts yellow eight-rowed corn per acre, and 1 quart pumpkin seed. As soon as the rows can be seen it is passed through with a corn cultivator, then top dressed with plaster and ashes, mixed in equal parts at the rate of a handful to three hills; the cultivator is then passed through once a week until it commences to tassel; hoed once. Canada thistles, stink-root and may-weed are the most troublesome weeds on my farm. Canada thistles have been killed by repeated plowings. Stink-root and may-weed are pulled and burned every year. Cost of marketing wheat and barley, 3 cents per bushel.

No other business appearing before the Society, an election of officers was called, when the following gentlemen were nominated and after ballot were declared duly elected:

President, Wm. Johnson, Esq., Seneca, and 15 Vice-Presidents; Rec'g Sec'y, John W. Holberton, Canandaigua; Cor'g Sec'y, Gideon Granger, do.; Treasurer, James S. Cooley, do.

The present year opens upon prospects every way encouraging. The Society has well-fenced grounds, containing upwards of ten acres; a commodious and well managed building, with offices for the transaction of their business; a graded riding track for the exhibition of horses,—the whole of which has cost rising ten thousand dollars, and upon which there remains unpaid only twenty-six hundred dollars. The premium list for the present year has been increased to $2,000, being about $800 more than the last. This increase has been mostly upon the various animals comprising the farm stock, and in hopes that the enhanced bounty will elevate competition, and by its effects improve the standard of excellence.

The great object of the Society is to foster a love for Agricultural life, to inspire the farmer with a spirit of emulation, in keeping with the tone of the age, and at the same time to encourage to a reasonable extent, a few days of relaxation from the cares and solicitude and monotony of toil.

JOHN W. HOLBERTON, *Rec'g Sec'y.*

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ORANGE.

The sixteenth annual exhibition of the Orange County Agricultural Society was held in the village of Newburgh on the 8th and 9th days of October, and was very largely attended.

The arrangements were well conceived and executed. The large tent belonging to the Society was erected on the grounds attached to "Washington Head-Quarters." The adjoining lots on the north and south were occupied by cattle, sheep and swine; and the street (Liberty,) on the west was devoted to the show of horses.

On the 8th there was a grand regatta in the bay, in full view from the show grounds; and a parade of the village firemen. These, combined with the natural beauty of the place and its historical associations, added pleasure and interest to the occasion.

The exhibition was in many respects superior to any heretofore held, and, though inferior in some departments to those of former years, was, on the whole, regarded as being very successful.

The Tent.—The tent was thronged with admiring crowds during both days of the fair. The show of fruit, considering the unfavorable weather, was very good. Of flowers there was a fine display. The exhibition of domestic manufactures, fancy and ornamental work, has not been excelled in any previous year. Evidence of the industry, taste and handiwork of the fair daughters of Orange met the eye on every side.

The mechanical department was well represented, containing the usual variety of the results of mechanical ingenuity and skill.

The show of Agricultural products, though not very extensive, embraced many extraordinary good specimens of roots and vegetables, which reflected the highest credit on the successful agriculturists who produced them.

Horses.—The horses, as usual, attracted much attention. The number exhibited was not as large as usual, but among those shown were some of great merit. A horse exhibition had been held at Goshen only three weeks previous, which may have contributed to produce a smaller show on this occasion.

For several years past great attention has been paid in this county to the raising of horses. The most popular and valuable breeds have been encouraged. Some of the best thorough-bred

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horses in the Union have been introduced, and have been so liberally sustained that their representatives are to be found in great numbers in all parts of the county. The effect of this introduction and encouragement of the best breeds has been such that Orange county now possesses a stock of horses of which she boasts and of which she may justly be proud, and with which she will lose nothing by comparison with any of her sister counties in the State.

Cattle.—The show of cattle was generally regarded as being fully equal to previous exhibitions. The present and previous exhibitions, however, do not seem to indicate that there is anything extraordinary, in the way of progress and improvement, taking place in our breeds of cattle. This is emphatically a *dairy county.* Most of the cattle are milch cows, and although grades of the improved breeds may be found in many dairies, still the overwhelming conclusion forced upon every observer is, that the so-called "Natives" are predominant in this county, and that for dairy purposes they are considered by many dairymen fully equal to any other breed. For working oxen, the Devon, and for fattening, the Durham, are generally prefered by farmers and graziers.

Sheep.—The few sheep exhibited were principally long and middle wooled, and were of superior excellence. Orange is by no means a wool producing county. The number of sheep, already small, is constantly and rapidly diminishing. Most of the sheep kept are brought from the west in autumn, sold in small lots to farmers, fed during the winter, and in the ensuing spring and autumn sent to market. Little attention is generally paid to improved breeds. A few select flocks comprise nearly all the good sheep in the county.

Swine.—The exhibition of swine was highly creditable—the Berkshire and Suffolk predominating. Among the former were some animals owned by E. C. Thayer, Esq., of Hamptonburgh, that would be hard to beat.

There is considerable pork fattened in the county, most of which is termed "light pork." Hitherto most of our farmers have been very indifferent in selecting their stock of swine—everything that had bristles being considered a pig, and among them no distinction was known—the land-shark was a pig and

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the Suffolk nothing more. A judicious discrimination, however, is now being made in favor of improved breeds.

SECOND DAY.

The second day was devoted to the trial of plows, the plowing match, the award of premiums, and the election of officers for the ensuing year.

A special premium of $50 had been offered by the President of the Society, Capt. H. Robinson, for a plow that, with the lightest draft, would turn a furrow 12 *inches wide and* 18 *inches deep, completely inverting the sward.* Eleven plows were entered for this premium. Each one was tested with a dynamometer. The premium was awarded to the plow of Minor & Horton (Peekskill,) No. 22.

The Plowing Match.—The plowing match was well contested. The ground was admirably adapted to the purpose; eight plows were entered, and the work was performed in a manner that elicited the warmest commendation of the admiring spectators, and reflected the highest credit on the skill of the plowmen.

The finances of the Society are in a prosperous condition. The report of the treasurer shows a surplus of over $200 in the treasury.

Officers for 1857.—President, Seely C. Roe, of Chester; Rec'g Sec'y, John C. McConnell, of Goshen; Cor'g Sec'y, Hamilton Morrison, Montgomery; Treasurer, William M. Sayre, Goshen; and an Executive Committee of five.

HAMILTON MORRISON, *Cor'g Sec'y.*

ORLEANS.

The annual fair of this Society was held at Albion, Orleans county, on the 25th and 26th of September, 1856,—was well attended, and the Society appeared prospering as well as could be expected without suitable grounds and buildings in which to convene. The income of the Society for the present year is as follows:

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From memberships and tickets sold at the fair,.....	$390 00
Amount on hand at time of fair,.....	113 41
	$503 41
By payments for premiums and expenses,.....	400 70
	$102 71

This Society has been merged into a new Society, organized under the act of 13th April, 1855, by filing certificate in the county clerk's office, and with Secretary of State, on 20th day of October, 1856.

Officers:—President, Timothy C. Bailey; Secretary, H. S. Goff; Treasurer, A. Thomas, and six Directors.

O. M. BARBER, *President*.

OSWEGO.

The annual fair was held at Mexico, Sept. 17th, 18th and 19th. The annual address was delivered by Harvey Palmer, President of the Society. The number of people in attendance was far more numerous than at any previous exhibition. The show of horses, cattle, sheep and swine was most creditable to the county, and in every department the exhibition was such as to do great credit to the farmers and mechanics of the county.

The Society was re-organized under the act of 1855, and the fairs located at Mexico, and commodious grounds secured for the purpose.

The receipts in 1856 from members and admissions was $1,287.33, larger than at any former fair, and the entries 470 in excess of those of 1855.

The county of Oswego possesses a soil eminently adapted to grazing and dairy purposes, and is amply supplied with pure water, an important desideratum in this branch of Agriculture. Butter and cheese will be the great staple of the county, which under good husbandry cannot fail to enrich, rather than impoverish the soil. It is believed that the same amount of capital invested in dairying in this county will give more profit than in the wheat-growing region of Western New-York.

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Winter meeting December 21. The treasurer reported

Receipts from all sources,	$1.457 57
Disbursements,	1,431 35
	$26 22

Officers for 1857:—President, Leonard Ames, Mexico; Vice-President, A. W. Severance, New Haven; Secretary, D. W. C. Peck, Mexico; Treasurer, L. H. Conklin, Mexico.

HARVEY PALMER, *President.*
A. W. SEVERANCE, *Secretary.*
L. H. CONKLIN, *Treasurer.*

OSWEGO.

The Society originally organized in this county, have submitted a report of the fair in 1856, which was held in New Haven, Sept. 17th and 18th. The exhibition was one of the best ever held by the Society. Horses, cattle, sheep and swine exhibited the improvement which had been made in the county. The show of fruit was not large, owing to the dry season, but some choice specimens of peaches attracted much attention. On the second day the plowing match and the exhibition of horses upon the course, were the great features of attraction.

The receipts for the year were,	$811 44
Expenditures,	546 00
	$265 44

Officers for 1857:—President, H. Murray, Oswego; Vice-President, J. J. Wolcott, Fulton; Rec'g Sec'y, J. A. Place, do.; Cor'g Sec'y, V. Douglass, Richlands; Treasurer, S. G. Merriam, New Haven.

J. H. WRIGHT, *Secretary pro tem.*

(It is to be regretted that two organizations exist in this county. It is hoped that the farmers and mechanics will unite in one organization, and thus harmoniously develope the resources of this excellent farming county.)

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OTSEGO.

The annual show of the Otsego County Agricultural Society was held at Cooperstown on the 8th and 9th of October. It was the first time that the Society had occupied its new grounds with a view to its permanent location in the county town; and some anxiety was felt as to the success of the experiment. Hitherto the northern part of the county had been somewhat unmindful of its true interests, and backward in keeping up that active organization and earnest effort without which no agricultural society can flourish or attain its proper growth and influence. On this occasion, however, the people shook off their long lethargy and turned out in such numbers and with such a will, that the result of the "new plan" was no longer doubtful.

The grounds now occupied by the Society consist of eight acres surrounded by a substantial high board fence. In the center is the building for exhibiting dairy products, domestic manufactures, &c., &c., and two ranges of convenient cattle sheds divided into stalls with an alley through the middle. There is a suitable building at the gate for ticket and business offices, and a well-graded track runs round the whole grounds, in the corners between which and the fence, are the sheep and swine pens. An abundant supply of running water is provided inside. The arrangements for cattle, though deemed ample, were found quite insufficient, and a greater amount of shedding is to be provided another year.

The two days of the exhibition were all that could be desired, as regards weather, and the bright October sun shone on the largest concourse of people ever assembled at an agricultural show in the county. The display of stock was very creditable, though it was regretted that the southern part of the county was not better represented. Mr. Lee, Mr. Roseboom, and others showed some good Short-horns, and Judge Bowne's Devons well represented that esteemed breed; whilst Mr. Clarke's large herd of grade Herefords, almost made up for the absence of thorough-breds in that class. This latter herd deserves especial notice, as a proof of what judicious crossing with good thorough-bred bulls will do in creating a stock of cattle, possessing nearly the uniformity and character of thorough-breds; more particularly, as

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this is a method of improving our native cattle within the reach of every one, only requiring the purchase of good males, and careful selection of the females, and then systematic, consistent crossing. It is a too common fault with most who begin in this way to improve their stock, that they do not retain the *females* they breed; but tempted by the butcher's or drover's extra price, dispose of them, and thus lose the means of taking the *second* upward step in the course of breeding, as it is only by breeding from constantly improving females that the best results are attained. Any man who will pursue this course, selecting good native females to begin with, and using thorough-bred bulls of either of the established races, and then continue crossing on their progeny for three or four generations, will at the end of a dozen years have a stock, if not equal to Mr. Clarke's, at least that he may be proud of. When one man's herd or farm will not warrant his buying alone, let him club with three or four of his neighbors and purchase a bull in common, and I will engage, the results will bear them out in the first expenditure. There were a few good Short-horns and Devon grades exhibited, but not nearly the number we expected to see, knowing the length of time these two breeds have been in the county. There were also some milch cows, whose *attested* performances in the butter line bordered on the incredible. Neither full-bred nor grade Alderneys were exhibited, though some good ones are known to be in the county, and several dairymen in the southern part are trying the experiment of crossing them on the natives. These small, hardy, butter giving Alderneys are so admirably adapted for "town" cows, if I may use the expression, that is, for the use of those living in towns and villages, having little land, and keeping a single cow, that I should be glad to see them better known here and more widely disseminated.

The show of sheep in nearly all the various breeds was very good; Long-wools, South-Downs and Merinos, were numerously and well represented, and there were several pens of a breed well deserving attention, and scarcely to be found in another county in the State, the "Cheviots," a strong, hardy, well-wooled, prolific sheep, quite able to "rough it," and so admirably fitted for the bleakest and coldest portions of our State. The show of swine was neither as large nor as good as it ought to have been. A

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few good Suffolks were exhibited, but no specimens of the Berkshire, Essex, or other improved breeds were to be found. In dairy products too, the display was not equal to the reputation of Otsego, though what was shown was of excellent quality.

The exhibition of domestic manufactures and miscellaneous articles filled the building appropriated to them, and from the crowds they attracted seemed to meet the approval of all.

On the second day the horses were shown, and the lovers of that noble animal were gratified with a fair show of all the various classes, though the "*young ones*" were not as numerous as we hope to see them another year. A stallion belonging to Mr. North deservedly received full meed of praise and admiration.

The address was delivered by B. P. Johnson, Esq., the popular and indefatigable Secretary of the State Agricultural Society, and was listened to with eager and pleased attention, by a large audience.

FRANCIS M. ROTCH, *President.*

Officers for 1857.—Francis M. Rotch, President; Alfred Clarke, Vice President; G. Pomeroy Keese, Secretary; F. A. Lee, Treasurer; and 6 Directors.

PUTNAM.

In consequence of unavoidable delay in arranging the accounts of our Society, I have been prevented making the usual yearly statement of the condition and doings of our County Agricultural Society. The annual exhibition was held at Lake Mahopac, in the township of Carmel, and although the attendance was quite as good as on previous occasions, still I did not consider the fair as successful as on former occasions. In defence of this result it is barely justice to the officers of the Society and the parties interested in making the preparations to state that the difference was mainly attributed to unwillingness of some to give their encouragement unless the fair was held in their immediate vicinage.

This position the officers of the Society felt constrained to discountenance, and in conformity to such principles determined to change the location to Mahopac, where the fair was held.

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The show of fat cattle was, as usual, very good in this county, and of swine and sheep fair; but domestic articles, fruit, flowers and vegetables, neither ornamented the grounds nor reflected credit on the farmers or farmers' wives of Putnam; but I indulge the hope we shall be able to make amend at our next gathering.

The following report of the treasurer will show the state of our funds:

Receipts,	$722 38
Expenditures,	365 43
Books on hand,	30 00

Officers, 1857:—President, Thos. B. Arden, Phillipstown, and six Vice-Presidents; Secretary, G. Mortimer Belding, Carmel; Treasurer, Saxton Smith, Putnam Valley.

THOS. B. ARDEN, *President.*

QUEENS

The fifteenth annual exhibition of the Queens County Agricultural Society, was held at Hempstead, on Thursday, September 25th, 1856.

The day opened with all the beauty of a clear autumnal sky, and everything was conducive to the pleasure of the occasion. At an early hour the people began to assemble on the ground, and a general bustle and activity were displayed by the exhibitors in arranging the various articles for exhibition.

The variety and quality of fruits and vegetables were never surpassed by any former exhibition in the county.

The show of horses was unusually large, of thorough bred stock, better than for many years; grade stock not so many as last year.

Nor were the ladies without interest in the affair; they not only graced the scene with their presence, but opened the treasures of their skill and industry in a great variety of useful, ornamental, and artistic articles. The number of visitors were estimated at ten thousand.

The Society is under great obligations to the various committees for their prompt attention to the duties assigned them, and especially to Samuel B. Mersereau, Esq., chairman of committee of arrangements, for his valuable services, (without fee or reward),

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and for settling the local accounts, and making a clear and concise report within four days after the fair.

Grain.—The show of grain was highly creditable, especially to the town of Hempstead; winter wheat weighing 62 lbs., oats 34 lbs. per bushel. A hill of corn was exhibited by Wm. L. Lanig, having 11 good sized ears; Samuel E. Johnson also exhibited a hill of "Wyandot corn," from one grain, having five stalks, and nine ears on it, (so 'twas said).

Precisely at noon, the President, Wm. T. McCoun, Esq., introduced the orator of the day, Mr. B. P. Johnson, the well-known Secretary of the New York State Agricultural Society, who proceeded to give his crowded audience a lesson full of practical wisdom and sound sense. He treated particularly of the utility of such agricultural exhibitions as this, enforcing his counsels by comparisons between American and British agriculture. He held that agricultural shows are things of infinite importance to the farmers and producers. Men who will not contribute of their substance to enrich their agricultural gatherings, on the ground that if they did exhibit they would be beaten, he argued were the men who were sure to be beaten, because of their lack of enterprise and energy. He had learned during his connection with the State Agricultural Society, that the men who were the most attentive and the most regular in their attendance upon the exhibitions, were the most successful farmers in the State. Nor is it essential that the farmer should be a learned man to be a good practical agriculturist; for, although the educated man, all other things being equal will be the most successful, yet the man in this State who took the 1st premium for improved farms in 1855, was a plain, honest, country farmer, J. V. Grove, Ovid, Seneca county; and there are many more like him. Mr. Johnson spoke in this connection of the Agricultural College which is finally to be established in this State after seven years of effort. He was proud to say that the site for that institution had been selected, and he made a point of inculcating in the ear of his audience the lesson of the necessity of giving the young farmer such a culture as shall enable him to advance his own peculiar science to a point far beyond that which it had reached. Certain principles lie at the foundation of all good farming. No farmer can be a practical man unless he manage his concerns with industry, energy and skill. He should

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be sure, too, to pay particular attention to the value and peculiar properties of manures—a point too much neglected, as a general thing, among American farmers.

In concluding he told sundry interesting anecdotes of his experience in London during the World's Fair. He was peculiarly racy in his descriptions of John Bull's amazement at the success of the American plow and of McCormick's reaper—two affairs the success of which reestablished the fame of this country upon a firm and lasting basis. He described at length the Queen's visit to the American department, and expressed his pleasure at the interest displayed by her majesty. A few words of good counsel to the farmer ended an address which was heard with great attention, and heartily approved by all.

A resolution of thanks was adopted, coupled with a request for a copy of the address for publication; but from the many and pressing engagements of Mr. Johnson he has been unable to comply with the request.

Trial of Mowing Machines.—A trial of mowing machines under the auspices of the Society took place on Monday, June 30, 1856. The field selected was about half a mile from Hempstead Branch, and covered by a heavy crop of clover on wheat stubble, very much lodged. Nine machines entered, viz.:

Allen's Patent; Dietz & Dunham's cam-motion; Burrall's Patent; Whitenack's Jersey mower; Hulett's Know Nothing; Weeke's Patent; Manny's combined reaper and mower, improved; Manny's four wheel reaper and mower; Manny's improved, used three years.

The following rules were laid down for the direction of the judges:

"They will take into consideration the cleanness of cutting; lightness of draft; simplicity of construction; durability, and least liability to get out of order. The speed of the horses not to exceed an ordinary plow walk. No trotting allowed."

Nearly six hundred persons were present, who greatly interfered with the trial; each machine seemed to have a drummer to sound its good qualities and defame its neighbor; and we are satisfied that these mowing trials, with so many persons around, and who will not keep at a proper distance, are not productive of results beneficial to the farming interest. If there could be such

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a thing as a trial, free from the presence and influence of special manufacturing interests, it is quite possible that the practical good sense of the farmers would settle down on some two or three of the machines now so prominently before the public. Nine machines were too many to try fairly and honestly, in one afternoon, and from the crowding of the spectators it was almost impossible for the judges to give to each machine the attention necessary to the formation of an accurate judgment of the peculiar qualities of each.

Half an acre was allotted to each machine, and they went to work about two o'clock, P. M. "Know Nothing" broke down about the second time round, and was considered out of the contest. The others continued on until they had finished their portion of the field. Burrall's machine was evidently under the charge of a person who knew nothing about driving a mowing machine. Concerning the working, there were as many opinions among the farmers and judges as there were machines at work—each had his favorite and all were favorites by turns. Manny's, Whitenack's and Allen's seemed to be the favorites among the farmers. Before the work was completed a dynamometer was attached to each in succession, and the power required to operate them was as follows:

	Length of cutting bar.	No. lbs. draft.
Burral's,	4 feet 8 inches,	321
Allen's,	4 " 6 "	336
Dietz & Dunham's,	4 " 8 "	348
Manny's Improved,	4 " 10 "	392
" " in use 3 years,	4 " 10 "	398
Whitenack's,	4 " 11 "	388
Weeke's,	4 " 8 "	340
Manny's four wheel,	4 " 10 "	438

The judges after much deliberation reported that "Manny's Improved" has the preference for cleanliness of cutting, and best adapted to the farmers' use, and was entitled to the first premium; Whitenack's Jersey Mower, second premium, and Weeke's Patent the third premium. They reported Allen's as doing good work, but not as convenient to move about as Manny's.

This was probably one of the greatest trials of mowing machines ever held, nine having entered, and considering that the time was fixed in the middle of hay time, when most farmers

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are busy, the attendance was unusually large; but we should like to see a trial with no spectators but the judges and drivers of the machines. The result to us was far from satisfactory.

The receipts and expenditures during the past year, have been as follows:

Balance on hand,		$142 21
Life-memberships,		70 00
Annual members and other sources,		932 79
State appropriation,		91 00
		$1,236 00
Expended for premiums and expenses,	$1,010 58	
Balance on hand,	225 42	
		$1,236 00

Officers for 1857:—President, Wm. T McCoun, Oyster Bay, and six Vice-Presidents; Cor'g Sec'y and Treasurer, John Harold, Hempstead; Rec'g Sec'y, Robert Willets, Flushing, and six Managers.

JOHN HAROLD, *Cor'g Secretary.*

RENSSELAER.

The fifteenth annual meeting of the Rensselaer County Agricultural Society was held at the Court House, in the city of Troy, January 20th 1857. Hon. Gideon Reynolds, President, was absent, and George Vail, Esq., Vice President, was called to preside.

There were no competitors for field crops.

B. Starbuck, from the committee to examine the Treasurer's accounts, reported the examination made, and that the accounts were found correct. The Treasurer then read his annual report as follows:

The receipts of the treasury, from all sources, since the last annual meeting, have been as follows, viz:

Balance of last year's account,	$283 00
Rec'd from Treasurer of the State of New-York	180 00
Rent of stands for sale of refreshments,	50 00
Received from Annual Members,	542 00
" " Life Members,	100 00

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Received from sale of gate tickets,		1,413 20
" " Donors,		160 00
		$2,728 20

The whole amount of disbursements since the last annual report, is—

For premiums,	$1,281 00	
Miscellaneous payments,	909 23	
Cash on hand,	537 97	
		$2,728 20

Life members in attendance at the fair, 170; whole number in attendance on the third day of the fair, 10,985.

A small debt only remaining unpaid, and funds nearly sufficient to wipe it out having been obtained, an estate worth $8,000, and free of debt, harmony and good feeling existing with all members, a determination on their part to make the coming annual fairs of this Society, better and more useful than the past, a desire to correct existing evils, and regulate all that is wrong in the working of the machinery, are circumstances in themselves, of no inconsiderable consequence to us all, to yourself must be particularly gratifying. We may expect the future to be much brighter than the past history of this Society, and those who are to control its destinies hereafter, have much to encourage them, and I trust they will be wise in adopting plans for action, and efficient in the execution of them, and success is almost certain.

Make the fairs of the Rensselaer County Agricultural Society what they should be, and multitudes will mingle with your pleasures, and many men will be made sensible of the benefits resulting from your judicious management, throughout the whole ramification of the agricultural and mechanical interests of the county, and it will be the holiday most valued, and sought unto by the people. And those who are about to retire from active participation in conducting the affairs of this noble enterprise, will rejoice with you, in the future growth, prosperity and usefulness of this long cherished Society.

I consider it an honor to be an officer of this Society, and am under lasting obligations to those who have for the last eight successive years selected me with so much unanimity for their financial officer. Of the manner I have discharged the duties of that

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responsible position it does not become me to speak, yet I may be permitted to say that in my poor measure, I have endeavored to bring a good degree of fidelity to the office conferred upon me, and while I am sensible of many wrongs on my part, I can truly say they were errors of judgment and not designed. Our intercourse has been of such a character, so pleasant and agreeable to myself, that a contemplation of a separation is extremely painful, whether it takes place now or at some future period.

Whatever may be my relation to this Society in the future, you may be assured of my cheerful cöoperation in all measures and efforts to promote its welfare, and hope to witness its prosperity, and onward march to the full accomplishment of all the important objects for which it was incorporated, and its usefulness known and acknowledged by all the inhabitants of the county.

A. VAN TUYL, *Treasurer.*

Mr. Isaac Tallmadge, of Schaghticoke, offered the following resolution:—

Resolved, That the thanks of the Society are due in an especial manner to George Vail, Esq., one of its most intelligent founders, for his ceaseless, liberal and well-directed efforts to sustain its best interest and extend its usefulness. Adopted.

The committee appointed to nominate officers now reported a ticket—a ballot was then taken, and the ticket nominated was elected, and is as follows:—

President, George Vail of Troy; 5 Vice Presidents; 17 Directors; Treasurer, Abram Van Tuyl, Troy; Secretary, William Hagen, Troy.

Mr. Rankin offered the following resolution:

Resolved, That the thanks of the Society be presented to the Hon. Gideon Reynolds, the late President, for his attention and devotion to the duties of that office, through the year just closed. Adopted.

WILLIAM HAGEN, *Secretary.*

ROCKLAND.

Officers for 1857.—S. W. Canfield, President, Piermont; A. E. Suffern, Cor'g Sec'y, Haverstraw; N. C. Blauvelt, Rec'g Sec'y, Spring Valley; Peter Stephens, Treasurer, Nyack Turnpike; and four Vice Presidents.

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ST. LAWRENCE.

The annual fair was held at Canton, 17th, 18th and 19th of Sept., and surpassed any previous year. The exhibition of stock, produce, implements, fruit, &c., was one of the best exhibitions ever made in this section of the State. The Secretary of the State Agricultural Society, who was present, remarked that the dairy products were the best that he had ever seen at any county fair. In extent and quality it could scarcely be excelled. It was estimated on Friday that there were at least 12,000 people upon the grounds—the day previous a larger collection. The address was delivered by Mr. Johnson, Secretary of the State Agricultural Society, and was as excellent in matter as the delivery was in manner. Many upon the ground during its delivery remarked, "We wish we were farmers." The Society have grounds containing 20 acres, enclosed, with beautiful groves admirably adapted to the objects of the Society.

Receipts, ... $2,959 80
Expenditures, ... 2,578 36

Officers.—H. G. Foote, President, Ogdensburgh; Henry C. Knowles, Secretary, Potsdam; Ebenezer Miner, Treasurer, Canton.

ST. LAWRENCE INTERNATIONAL AGRICULTURAL AND MECHANICAL SOCIETY—ORGANIZED 1856.

The first annual fair was held at Ogdensburgh on the commodious grounds of the Society, and was a very successful exhibition. The attendance was large, and the exhibition in the various departments highly creditable.

Receipts, ... $5,084 00
Expenditures, ... 5,082 56

A. P. Morse, President; Chas. Shepard, Secretary; George N. Seymour, Treasurer.

SARATOGA.

The Saratoga County Agricultural Society has had another prosperous year—the sixteenth annual fair, held on the Society's grounds at Mechanicville in September last, having been a highly successful one indeed. The number of entries was 594, against

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492 in 1855; and the receipts were $708.39, against $573.83 in 1855. The show was good in most of the departments, but the stock, particularly cattle, attracted much attention and commendation.

A new feature, being a sale of stock at auction on the grounds, the last day of the fair was introduced, but at so late a day that brief notice was given of it, and it was broken up by a shower of rain whilst in progress, so that no opinion of its benefit can hardly be given; still we think favorably of it, and it will probably be continued at future fairs.

Besides the premiums awarded at the annual fair a meeting was held of the Executive Committee Dec. 15, at which Mr. H. A. Van Wie, having presented properly verified statements, was awarded premiums for crops of corn and potatoes. He raised 60½ bushels of shelled corn at an expense of $15 per acre, and 130½ bushels of Peachblow potatoes upon an acre, at an expense of $11, Mr. Van Wie occupies the farm lately owned by Hon. Samuel Cheever at Bemus' Heights.

The officers of the Society for the ensuing year are: Nathaniel Mann, President, Isaac Clements and Joel C. Rouse, Vice Presidents; Reuben S. Burtis, Treasurer; Lewis E. Smith, Corresponding Secretary; E. J. Huling, Recording Secretary.

E. J. HULING, *Rec'g Secretary.*

SCHUYLER.

The Schuyler County Agricultural Society would respectfully report that the Society held their annual fair and cattle show in the village of Watkins, on the 8th and 9th days of October, 1856. There was an increased attendance over last year. The number of horses, cattle and other live stock was greater than the previous year. The show of articles at the hall was larger in all its departments, except fruit, all kinds of which were deficient.

The officers elected for the ensuing year are as follows:

President, J. M. Jackson, Altay, and six Vice-Presidents; Treasurer, Thomas Evans, Watkins; Secretary, Orlando Hurd, Watkins.

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Balance on hand from last year,	$10 00
The receipts at the fair were,	227 00
Paid out for premiums,	171 50
Expenses,	46 00

DANIEL TUTTLE, *President.*

ORLANDO HURD, *Secretary.*

SULLIVAN.

The annual fair and cattle show of the Sullivan County Agricultural Society for 1856, was held in Monticello, on the 9th day of October. The concourse of people, as usual on such occasions in this county, was immense; but truth compels me to say that, *as usual*, the exhibition was unworthy the farmers of Sullivan, and the occasion. Our agriculturists generally, and even members of the Society, evince a backwardness in adding to the interest of fairs, which is far, very far from commendable. It is hoped that a better time is coming.

Officers for the present year:

President, Lewis Moore, Monticello, and 14 Vice-Presidents; Secretary, James L. Stewart, Monticello; Treasurer, Cornelius Hatch, Monticello; Cor'g Sec'y, James E. Quinlan, Monticello; Executive Committee of six.

JAMES E. QUINLAN, *Cor'g Secretary.*

TIOGA.

This Society was incorporated in 1855, and since has successfully sustained itself, and still exists with increasing prospects of usefulness. The effects and usefulness of this Society in the county for good, cannot be questioned. The marked improvement in the stock exhibited at the last county fair, from that which was exhibited in 1855, tends to encourage the Society to make greater exertions during the present year. The farmers are becoming more and more alive to the importance of improving their stock. The great superiority in flesh, and in milk and butter, and the high prices which thorough-bred stock brings, as compared with the old or native breeds, are stimulating all who

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take pride in raising stock, to greater care and exertion in securing the very best breeds that can anywhere be obtained.

Besides, the fairs have given a stimulus to gentlemen of means to import specimens of the best breeds, so that at the last fair, there was a very creditable display of stock animals, either of pure blood or very high grades.

For some years past the culture of wheat has not been successful in this county, and therefore other kinds of grain have received the attention of farmers, who are now turning their attention to the raising of cattle, horses and sheep, and also to the business of dairying; the last of which employments, owing to the fine pastures which the valley of the Susquehanna supplies, and to the facilities which the New-York and Erie Railroad affords, is yearly becoming more and more remunerative to all engaged in it.

The number of cattle in this county, in proportion to the number of its inhabitants, at least equals that of any other in the State; and at the last fair a large number of fine specimens were exhibited, of Durhams, Ayrshires, and Devons.

The annual fair was held on grounds procured for the occasion, in Owego, on the 24th and 25th of September last. The weather was excellent, and the attendance from all parts of the county was on both days, especially the last, very large. Owing to the fact that the grounds were not specially enclosed, and that no admission fees were charged, the Society was not able to offer as large a list of premiums as it otherwise might have done. But the Society at its business meeting, on the last day of the fair, passed the following resolution.

"*Resolved*, That the officers and members of this Society will use their best endeavors to secure, by lease or purchase, a sufficient lot of ground for the purpose of holding our annual county fairs, and for other similar purposes, and that said lot shall be so fenced, and fitted with proper buildings, that stock and horse fairs can be held therein whenever convenient."

The following are the officers elected for the ensuing year, on Sept. the 24th ult.:

President, Louis P. Legg, and three Vice-Presidents; Secretary, W. Smyth; Treasurer, T. J. Chatfield, two Directors and ten Assistants.

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The treasurer presents the following report of receipts and disbursements during the year 1856:

By cash received for memberships,	$213 00
By cash from State,	61 00
Total received,	$274 00
Paid in premiums and incidentals,	271 62
Balance remaining in treasury,	$2 38

LOUIS P. LEGG, *President.*

THE CROPS OF TIOGA COUNTY AND ESPECIALLY THE TOWN OF NICHOLS, FOR 1856.

1st. *Winter wheat*—Of this crop more was harvested than in a number of years, and the crop was less injured by the wheat fly or midge than before, since its appearance in the vicinity; of the Soule species there was some fine fields; the Mediterranean and Blue stem are considerably raised, the average yield I concluded was between eight and ten bushels per acre; there was more spring wheat raised than before in a number of years, and of a better quality and less injured by the insects; the crop appearing to ripen after the day of the insect; the yield was about fifteen bushels per acre.

2d. *Rye.*—Rye crops generally very fine; grain uncommon plump and heavy, and a large amount raised; years ago there was but little rye raised in this county, but for the last three years a large amount has been raised, in consequence of the destruction of wheat by the insect; the yield was about twenty bushels per acre. We begin to conclude that we can raise rye here as well as in some of the older counties of the State.

3d. *Barley.*—Of this grain there was but little raised, as far as I could ascertain; the kind of barley in this vicinity being two and four rowed mixed together, and does not ripen even; good barley can be raised here.

4th. *Indian Corn.*—A large portion of the corn planted in this vicinity did not come up the first time planting, and a number of fields were planted over three times; in consequence of the corn vegetating so bad a number of rows were not filled out; and by the middle of July the weather was so dry that the leaves or blades of corn began to roll by nine o'clock, and would continue

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rolled until sundown, and by the middle of August the leaves would frequently remain rolled all night, especially on gravelly knolls; in consequence of the corn coming up so poor, and the great drought many fields were not half a crop. In all probability the yield is not more than twenty bushels per acre; a few fields on the river flats yielded 50 bushels per acre, while others not more than ten. The principal varieties raised are the large and small Dutton, Red glazed eight rowed corn, Evans' eight rowed yellow, small yellow Canada, Canada white flint, Delaware white, and two or three other kinds of white corn.

5th. *Buckwheat.*—A large quantity of this grain was sown, but in consequence of the great drought, a large portion did not come up, especially on hilly land, where a majority of the Buckwheat is raised. I saw a number of fields five weeks after being sown, and they appeared, with the exception of a few spots, as if not sown; such fields did not yield over five bushels per acre, and some not that. I prefer to sow from the tenth to the twelfth of July, for I would rather risk the frost than sow earlier and have the crop scorched by the sun, and I never fail of a fine crop. My crop of 1856 was on a diluvial formation, and very stony and dry, and yielded as much as 31 bushels per acre; the yield for the county was not over 14 bushels per acre.

6th. *Oats.*—In consequence of the cold wet May, and the very dry summer, the oat crop was lighter than before in a number of years; some fields of four or five acres were drawn in at one load, and in a number of fields, the straw was so short that it was difficult binding; in some cases long straw had to be carried for that purpose. I regret to say that it is the practice of some farmers to sow a field two and even three years in succession with oats; such a course causes the last crop to be light. I conclude the average of the county to be not over 18 bushels per acre; a few early sown fields along streams, yielded 40 to 50 bushels per acre.

7th. *Beans and Peas*, as far as I can ascertain, are not raised to much amount, every farmer generally raises a small patch of both, and they, like all other vegetables, suffered with the drought.

8th. *Grass and Hay.*—Of the grass crop there was plenty till the middle of July, and from that time until the end of the year it was of the shortest kind; by the 10th of August the fields

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appeared of a drab color, and the latter part of the summer, and all the fall the cows did not give half as much as in the fore part of summer; a number of wells dried by the first of August, and all streams, except in a few pools. The Hay crop was quite abundant, and as good as former years, but the latter part ripened rather fast; the yield must have been one and a fourth tons per acre; some fields yielded over two tons, while some old mossy meadows yielded not more than half a ton per acre.

9th. *Potatoes.*—Singular as it may seem the potatoes were larger on an average than before in fifteen years, but frequently but few in a hill. I saw a number of potatoes they said weighed from 2½ to 3 lbs. a piece; the yield was about 70 bushels per acre, and they hardly rotted at all.

10th. *Flax and Hemp.*—As far as I could ascertain but very little raised, a few farmers raising half an acre of flax.

11th. *Millett.*—Of this grain, as far as I could learn, there was but a small quantity raised. When raised it is generally a profitable crop; grain near equal to corn; the straw quite as good as hay.

12th. *Hops.*—A few farmers raise hops, and generally with quite good success. A few have entered into the business within a year.

13th. *Fruit.*—A large amount of apples generally raised here, and a large variety of grafted apples; of pears but few are raised, but there has been enough tried to show they will do well here, contrary to former expectation. Plums and cherries, of the former raising, the trees are about all dead. The apple crop for 1856 was very light, many orchards not having 50 bushels, while they were quite full; the crop was not half a one.

14th. The price of grain and produce for 1856 was quite moderate and varied but little, all the latter part. Wheat, $1.37 to $1.50; Rye, 62½ cts.; Corn, 62½ cts.; Buckwheat 48 to 50 cts.; Barley, $1; Oats, from 37½ to 40 cts.; Potatoes, from 30 to 37½ cts.; Butter, from 18 to 23 cts. per lb.; Cheese, from 9 to 10 cts.; Pork in the hog, from 6½ to 8½ cts; Beef, per quarter 5 to 6 cts. These are the prices all along the N. Y. and Erie Railroad, and even a few miles back from the road.

15th. The prices of cattle, horses, &c., have ranged quite high: a common work horse from $130 to $150, and oxen per yoke

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about the same price; cows from $25 to $35, a few as high as $50; sheep from $2 to $4, according to quality.

ROBERT HOWELL.

TOMPKINS.

The exhibition of this Society, in its various departments was very creditable to the county. The show of Short-horn cattle was much the best ever given in the county. That of Devons, was of very great excellence. The show of sheep and horses was very creditable. In the implement and miscellaneous departments were many articles of very great excellence; and the whole fair was of a character calculated to inspire the farmer with new zeal for the improvement of the agriculture of the county.

E. L. B. CURTIS, *President.*

ULSTER.

The Ulster County Agricultural Society held its annual fair and cattle show at Kingston, on the 9th and 10th days of October.

The weather was very pleasant and the attendance exceedingly large. The exhibition of animal stock far exceeded that of any preceding fair of the Society, both in numbers and quality. Many very fine horses were exhibited. Working cattle, milch cows and beef cattle were unusually fine. The show of sheep and swine was more extensive than at former fairs, and of superior quality. Poultry was not as abundant as on some former occasions, but some very fine specimens were exhibited. The display of vegetable productions generally was magnificent; fruit very fine in quality, though limited in variety and quantity; manufactured articles of improved workmanship, and with the various productions not mentioned or alluded to here, constituting a very creditable exhibition.

The annual address before the Society was delivered on the fair grounds at 2 P. M., on the second day of the exhibition, by Geo. H. Sharp, Esq. It was an appropriate and able production, and was well received. The delivery of the address was preceded by a prayer by Rev. C. Westbrook, D. D.

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Immediately after the delivery of the address, a ladies' riding match came off, which undoubtedly added to the interest of the fair. Although the announcement that female equestrians would be upon the grounds undoubtedly contributed largely to increase the number present, it is nevertheless very evident that much more interest is felt by those engaged in agricultural pursuits than formerly. The exhibitions and the attendance at our county fairs, alike demonstrate the fact.

The crops of this county have turned out well the past season generally, and of some descriptions the yield has been exceedingly large. Under this head I may mention corn and buckwheat particularly.

The first premium on yield of corn was awarded to C. L. Kiersted, Esq., of the town of Kingston, the yield being 107 5/8 bush. per acre. The second premium on corn to C. M. Van Leuven, the present president of the Society—yield 82 4/8 bush. per acre. Both of the above named gentlemen are excellent farmers, as the lands they cultivate plainly show.

The first premium on yield of wheat was taken by John P. Kimble, of Saugerties. His field embraced a number of acres, and yielded 25 3/4 bush. per acre. The quality of the grain was exceedingly fine, the berry very plump, large and white. A bag of the wheat was exhibited at the fair, and the premium for best bushel of that grain awarded therefor.

Peter Crispell, Jr. of Hurley, took the first premium on yield of potatoes—416 32/8 bush. to the acre. They are of the Yam species; they yield abundantly in strong soil, such as the rich Hurley flats on which Mr. Crispell grows them.

First premium on oats, C. M. Van Leuven, 85 4/8 bush. per acre; second, James Kiersted, 68½ bush. per acre. C. L. Kiersted took two premiums on rye. The yield was 37½ bush. per acre on his lowland, and 31½ bush. per acre on upland. C. L. Kiersted best acre of hay, producing 6800 lbs. There were a number of vegetable and fruit productions at the fair worthy of special notice; among them some very fine seedling potatoes raised by G. N. Roosa of Hurley; several specimens of corn, of different varieties, of most luxuriant growth, raised by Russell N. Isaacs of Saugerties; splendid specimens of grapes, from the lot of John Russell of this village; pumpkins of extraordinary size and

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quality from the farm of James Kiersted; California potatoes, raised by Dr. Crispell, and a number of specimens of exceedingly fine potatoes and other vegetables raised by Col. E. J. McCarthy of Saugerties.

At a meeting of the Society, pursuant to due notice, at Brown's Kingston Hotel, on the 27th day of December, 1856, for the purpose of electing officers for the coming year, the following were chosen.

C. M. Van Leuven, President; 4 Vice Presidents; S. S. Hommel, Recording Secretary; Peter Crispell, Jr., Corresp'g Secretary; John Chipp, Jr. Treasurer.

S. S. HOMMEL, *Secretary.*

WARREN.

It affords me pleasure to communicate to you the formation of the Warren County Agricultural Society. Our county has been very backward in agricultural matters—the greater part of the population and capital being engaged in the lumber business, but now that the timber is cut down to so great an extent, they begin to look for some more permanent source of employment and wealth. Our soil needs considerable labor and expenditure to get it under profitable cultivation; but we have many instances of patient perseverance being well rewarded.

We anticipate much benefit from the formation of this association, by the dissemination of agricultural reports and newspapers, from the discussions at our weekly meeting, and from the emulation excited by a public fair. Though the idea of our organization has been but recently suggested, it is received with a good deal of favor by the farmers and others, and we hope to have upon our roll the majority of the landowners in the county.

The officers for the present year are: Benjamin C. Butter, President; Charles H. Skillman, Corresponding Secretary; Andrew J. Cherritree, Recording Secretary; Wm. H. Wells, Treasurer; and five Vice-Presidents.

C. H. SKILLMAN, *Cor'g Secretary.*

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WASHINGTON.

I would briefly state that while a general apathy exists on the part of our farmers in this county, in respect to the interests and prosperity of our Society, arising in part no doubt from the too common errors in all Societies of this kind, *favoritism* on the part of those who compose the viewing committees, as also in the arrangement of the premium lists, yet the fair of the present year, in respect to numbers present, was at once commendable, there not having been less than from 15,000 to 20,000 people present, as estimated by good judges.

The fair was held at Union village, on the 17th and 18th of September.

The show of stock, with the exception of horses, was not what could have been desired. The display of horses evinced a good degree of interest in that department, and the horses were worthy of the enterprise and good judgment of the yeomanry of "old" Washington county. The display in the Agricultural department proper, as also in the ladies' department, although not without merit, was not what might have been expected. We trust that we shall not be considered unwise in our own estimation, when we attribute much of the failure witnessed in our county fairs, to that very popular department which has recently been added to the programme of almost all our Agricultural Fairs, to wit.: that of "Ladies' Equestrianship." Without entering into detail in this matter, we give it as our decided opinion, that the influence and tendency of said department materially detracts from the interest formerly taken in the more appropriate objects of the Society. Much credit is due the president, Dr. Savage, as well as the inhabitants of Union village, for their generous efforts in behalf of the Society, at its late fair. To their efforts, in a great measure, was the success of the fair attributable. The very able and well directed addressed of James O. Miller, Jr., of Montgomery, Orange county, N. Y., and of Dr. Savage, the president at the fair, have been published in pamphlet form, copies of which you have doubtless seen.

In conclusion we would add that our Society receives the support and influence of some of the best men in the county, and under judicious management may continue to form a valuable

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auxiliary in the prosperity and advancement of the science of agriculture.

At the annual meeting held January 13, 1857, premiums were awarded on Indian corn, wheat, timothy seed, barley, oats, buckwheat, turnips and carrots. A special premium was awarded for vetches raised by B. C. Bishop of Jackson. The fair for 1857 was located at South Hartford, in the 2d Assembly district, $150 having been raised to cover expenses.

Officers for 1857.—President, Hon. Henry W. Beckwith, North Granville; Recording Secretary, R. K. Crocker, North White Creek; Assistant do., Wm. L. Mowry, Greenwich; Corresponding Secretary, Rev. E. H. Newton, Jackson; Treasurer, S. W. Crosby North White Creek; five Vice-Presidents and an Executive Committee of one from each town.

On motion of Dr. A. Fitch, it was voted that, as an event of no ordinary moment to this Society, the decease of its first president and constant friend, Henry Holmes, has occurred since the last annual meeting, a committee be appointed to prepare suitable resolutions for insertion in our minutes and for publication, in commemoration of this bereavement. The chair thereupon appointed A. Fitch, J. M. Stevenson and John McDonald said committee.

Pursuant to said vote, the following preamble and resolutions were presented by said committee and adopted by the Society:

Whereas, Henry Holmes, of Union Village, one of the originators of this Society and its first President—one of its most substantial friends and supporters, to whose vigorous and efficient exertions we are indebted for much of the prosperity which has attended this Society hitherto, and rendered it to such an extent an honor to our county and a benefit to its citizens, has departed this life since our last annual meeting,

Resolved, That we deeply sympathize with the family, the friends and the section of our county, which, in common with this Society, has sustained so great a loss in this dispensation of Divine Providence.

Resolved. That the foregoing preamble and resolution be entered upon the records of this Society, and published with the proceedings of this meeting, and that a copy of the same be furnished for insertion in the Country Gentleman.

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On motion,

Resolved, That the thanks of this Society be tendered to Dr. James Savage, for the efficient and highly capable manner in which he has discharged his duties as President of this Society.

JAMES SAVAGE, *President*.

R. K. CROCKER, *Rec'g Secretary*.

WAYNE.

The operations of the Wayne County Agricultural Society for the past year present nothing specially important. The interest heretofore manifested remains unabated, and has the effect to stimulate the agricultural and mechanical interests of the county.

A new feature in our operations has been the establishment of an annual exhibition of Horses; the first of which was held on the Society's grounds the 5th and 6th of June last, with unexampled success. Many of the finest horses in the State were upon exhibition. The great and increasing demand for good horses, and the high prices paid for them for several years past, render this branch of husbandry second to no other in the country, and seems to warrant a special occasion for its benefit. Horse dealers are attracted to these exhibitions, and the splendid sales of fine horses at our show in June last, fully warrant the belief that these exhibitions will prove of great value to producers of good horses.

The annual fair and cattle show was held in September last, and although the exhibition was good in every department, it was materially affected by the weather, which was cold and wet during the first two days. The show of cattle was however, better than ever before seen in the county. The show of horses was also large and fine. The Society is in a prosperous condition and is regarded with favor by all enterprising farmers and mechanics in the county.

The annual meeting of the Society was held in the village of Lyons, the first Wednesday in January, 1857. The meeting was large and more than usual interest manifested in its proceedings. The following officers were elected for the year 1857.

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President, Eron N. Thomas, Rose; Vice President, William D. Perrine, Lyons; Secretary, George W. Cramer, Lyons; Treasurer, William H. Sisson, Lyons.

At the annual meeting of the Agricultural Society, the following resolutions were passed.

Offered by S. B. Gavitt.

Whereas, Dr. D. W. C. Van Slyck, has held the office of President of the county agricultural Society of this county for the past two years, during which time it was deemed that the old organization did not meet the wants of the community, and the present one was duly instituted and perfected; to the consummation of this organization, he has borne an important part, devoting his time and energies for that purpose; and now that the Society has gained a new and substantial basis, suitable grounds and buildings, needing only a wise and systematic continuance of the policy already begun by our worthy President, and his associates in office; and whereas, he has expressed his determination to retire from the position of its chief officer, therefore,

Resolved, That the thanks of this Society are due and hereby cordially tendered to him for his valuable services, and the manner in which he has presided over its affairs; and in retiring he has our best wishes for his future happiness and prosperity.

DE WITT C. VAN SLYCK, *President*.

WESTCHESTER.

The 12th annual fair of the Westchester Agricultural and Horticultural Society was an interesting one, and encouraging to the members of the Society.

Officers:—President, Henry Wood, Bedford; Treasurer, James Armstrong, White Plains; Cor'g Sec'y, D. R. Sherwood, Sing Sing; Rec'g Sec'y, John Cowan, White Plains.

WYOMING.

The Wyoming County Agricultural Society is in a prosperous condition. Its last annual fair, in October, was attended by at least ten thousand people. Doubtless there is great room for

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improvement in the modes of conducting our fairs, but the sustained and increasing interest manifested in the fair of 1856, show that they are adapted to the wants of the people. They supply some great social and industrial necessities. I may be permitted to allude to misconceptions, as to the object and intention of fairs: It seems to be supposed that they are for the purpose of displaying monstrosities—a ready method of *publishing* the biggest, fattest, and most elaborate—a way to gratify the spirit of rivalry, and encourage extravagant and profitless expenditures.

On the contrary let our State and County Societies spare no pains to encourage what is really meritorious, and particularly to encourage inquiry as to the best and cheapest way of accomplishing desirable results. It is to be regretted that the premiums offered by the State Society, for well conducted experiments have not been responded to as they should have been. A fat hog may not be entitled to a premium, but a hog fattened by a cheaper process than had hitherto been divulged would deserve very marked attention. So of large yields of vegetable products; when they can be secured with marked diminution of cost they are not only entitled to premiums, but every particular of their production should be carefully promulgated. The managers of Agricultural Societies are beset with difficulties, and are not always fortunate in having their acts regarded in the light of christian charity, I would not therefore wish to enlarge their labors or augment the difficulties of their position; and yet it strikes me that while our organizations have been powerful stimulants to improvement, they have failed to accomplish all that is attainable.

An Agricultural fair should not come by chance, or be a "collection of miscellanies," miscellaneously arranged.

All recent inventions, at any rate all *improvements*, should be called out, classified and arranged so that visitors can at a glance compare one with another and decide between them. Here are fifty different models of fence, side by side; there are a dozen reapers and mowers; and yonder the cultivators and plows are in formidable array—let the public judge between them.

A "*collection*," worthy of the name can not be made without the direct intervention of the officers of the Society—they should

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be in constant correspondence with inventors, &c., and offer such inducement as will secure the attendance of whatever will add interest to the show.

As matters now are, many humbugs are ostentatiously displayed, while a great deal of value remains at home, unnoticed and unknown. The world is made up of small things, and there are a great many little improvements, not patented, that need to be got before the people.

Let it be our aim to help forward, by every possible means, the great interests of Agriculture and kindred pursuits.

Receipts,	$441 87
Expenditures,	342 02

Officers:—President, Hugh T. Brooks; Secretary, E. L. Babbit; Treasurer, J. A. McElwain.

HUGH T. BROOKS, *President.*

YATES.

The sixteenth annual fair of this Society was held at the village of Penn Yan on the 9th and 10th of October, 1856, and was attended by an unprecedented concourse of people from every part of this and the surrounding counties. It affords us great pleasure to be enabled to say, that notwithstanding a little hostile feeling has been manifested in remote parts of the county, and no less than two very respectable and, as we are no doubt correctly informed, very promising rival Societies—one of several towns from Steuben and the other from a portion of old Ontario—yet the Society never gave more cheering signs of promise and the ultimate attainment of the objects sought than it does at this present time, as will appear from the sequel. In proof of this, it is only necessary to add that the amount received during the past year, as compared with any previous year, shows a very large increase, and the amount of premiums paid shows the same result.

Everything throughout the county in an agricultural point, from year to year, bears evidence of a *new impulse*, particularly in the improving, growing and importing good stock; five years since there was not a "full blood" in the county. We are proud to say that we think we are prepared to compete successfully now

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with any other like portion of territory in the State. Mr. Daniel Suplee of the town of Starkey, who by-the-by is one of our best and ablest farmers, has to-day in his yard probably one of the best full-blood Durham bulls in Western New-York; and in fact we have seen many imported animals of long and high sounding names and pedigree greatly his inferior.

In fact through the influence and the success of our laudable efforts to improve, refine and enlighten the people in an agricultural point of view, by keeping up our Society and our annual fairs, the agricultural newspaper enterprise is greatly indebted. Greatly to the credit of our citizens, scarcely a farmer can be found who does not read some work on agriculture—take one or more agricultural papers, or who has so thrown off all bigotry, or sufficient at least as to be greatly influenced by those of his neighbors who do read. We have been credibly informed that there are taken in this county over 500 copies of Moore's Rural New-Yorker alone, and in which many valuable suggestions, "facts and figures," are weekly given, with which the farmer, from time to time, is wont to compare his judgment and his experience; he is led to think—to read more—to talk, and to talk intelligibly, if not scientifically, on agricultural subjects; and thus the mind is improved, his condition in life bettered, his happiness, comfort, and that of his family increased, and the world benefited by his having lived in it.

The annual address was delivered by our townsman, the Hon. D. A. Ogden, late Consul to Honolulu.

The annual winter meeting of the Society convened at Washington Hall, on Saturday, December 18, and was called to order by Col. Gilbert Sherer, President.

The report of the Treasurer was read by Wm. S. Judd, which on motion of Charles Wagener, was adopted.

Receipts:

Received for memberships,	$278 00
" " admissions to fair grounds,	400 63
" from festival,	100 00
" for rent of fair grounds,	20 00
" from treasurer of 1855,	8 54
Due from State to Society,	61 00
	$868 17

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Disbursements:

Paid on account of 1855,	$139 69	
" miscellaneous accounts,	294 80	
" exp. fitting up grounds and during fair,	145 97	
" premiums,	187 82	
Cash on hand,	99 89	
		$868 17

William T. Remer offered the following resolution which was adopted.

Resolved, That all premiums awarded by the Yates County Agricultural Society that are not called for, at least ten days before the second Saturday in December, will be considered donated to the Society, and it shall be the duty of the treasurer to so enter them on his books.

The Society then proceeded to the election of officers with the following result:

President, Gilbert Sherer; Vice President, Samual V. Miller; Secretary, Benjamin L. Hoyt; Treasurer, William S. Judd; and 9 directors.

William S. Judd offered the following resolution, which was adopted:

Resolved, That the use of the fair ground be tendered to the Wool Growers' Association of Western New-York, for their next annual show, provided the association select Penn Yan as the place of such exhibition.

GILBERT SHERER, *President.*

WM. S. JUDD, *Secretary.*

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TOWN AND UNION ASSOCIATIONS.

Reports have been received from several of these associations, from which brief extracts are given. They have been very successful, and have been well sustained, and show the increased interest which is taken in agriculture, in the State.

Union Agricultural Society, Palmyra.—Organised in June, 1856. Martin Butterfield, President, Palmyra; Stephen Hyde, Palmyra, W. H. Teller, Manchester, and Russell Stoddard, Farrington, Vice Presidents; Carlton H. Rogers, Secretary, Palmyra; Joseph D. Lovett, Treasurer, Palmyra; and 5 Directors.

Nineteen acres of land, at Palmyra have been enclosed, with commodious buildings for the purposes of the Society; about $5,000 have been expended in buildings, enclosing and improving the grounds.

The fair was held Oct. 21st, to 24th, and was most successful. The display of cattle, horses, sheep, swine and poultry was excellent. The whole number of entries of stock, 689. Of fruits and vegetables the display was one of the best ever exhibited in this section of the State. A dedicatory address was delivered by Rev. G. D. Gillespie. [Extract from report of Society.]

Virgil Town Association, Cortland County.—Fair held September 17th and 18th. The general interest in the Society drew together a large share of the inhabitants of the town, and many from adjacent towns. There was a fair exhibition of stock and a good show of dairy products. Prospects encouraging. Nathan Bouton, President; and Charles B. Gleason, Secretary.

Dryden, Tompkins County.—Fair held Oct. 8th and 9th, in an enclosure of four acres. A large assemblage of people witnessed an excellent display of stock. The mechanical and ornamental departments well sustained, and for a first fair it was considered successful.

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Receipts,	$525 63
Expenditures,	475 32
	$50 31

Hon. Elias W. Cady, President; O. E. Wood, Secretary; D. R. Goodhue, Treasurer.

RUSHVILLE UNION AGRICULTURAL SOCIETY, Yates county.—The second annual fair was held Sept. 22d and 23d, and was very largely attended. The display of stock was very encouraging; Mechanical contributions showed a progressive improvement, and all branches of industry were well represented. An address from the President, M. H. Lawrence, "blending instruction with delight," was most cordially received.

Receipts,	$561 27
Expenditures,	527 91
Balance,	$33 36

Geo. W. Stearns, President; John Sayre, Recording Secretary; A. S. Lindsley, Corresponding Secretary; John Wisewell, Treasurer; and three Vice-Presidents.

LEON AGRICULTURAL CLUB, Cattaraugus County.—The annual fair was held Oct. 16. An increasing interest was apparent in the exhibition, and all the departments were respectably represented.

Everett Stickney, President; N. F. Cooper, Vice-President; Miles Coe, Secretary; C. Morgan, Treasurer; and five Directors.

BAINBRIDGE AGRICULTURAL SOCIETY, Chenango County.—This Society was organized January, 1857. Philo Kirby, President; six Vice-Presidents; Burr C. Campbell, Secretary; Joseph Juliand 2d, Treasurer; and six Directors.

WIS-KOY AGRICULTURAL SOCIETY, Allegany County.—The annual fair was held Sept, 16 and 17. A large assortment of stock and manufactured articles of the best quality was exhibited. An address by H. C. White, of Buffalo, was delivered, and the results of the exhibition most cheering to the friends of agricultural improvement.

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O. V. Whitcomb, President, Pike; M. L. Rice, Secretary, Pike; John Renwick, Treasurer, Pike; three Vice-Presidents and six Directors.

LEBANON AGRICULTURAL AND HORTICULTURAL SOCIETY, Madison County.—Daniel B. Shapley, President; Alfred Seymour, Rec'g Sec'y; Edward S. Benedict, Treasurer.

BROOKFIELD AGRICULTURAL SOCIETY, Madison County.

Receipts,	$845 63
Expenditures,	495 39
	$354 44

H. A. Brown, President; John T. G. Bailey, Secretary; C. Whitford, Treasurer.

HARTLAND TOWN AGRICULTURAL SOCIETY, Niagara County.—First fair, September 26th and 27th, was largely attended by the farmers. Quite a respectable number of entries of stock and manufactured articles were made, and taken as a whole the exhibition excelled the expectation of those engaged in promoting the interests of Agriculture in the town.

Receipts,	$115 36
Expenditures,	75 65
	$39 71

Asa P. Aldrich, President; J. C. Deuel, Secretary; Zeno Hoag, Treasurer.

PERRY AND CASTILE SOCIETY, Wyoming County.—Fair held at Perry, in October, and largely attended. The exhibition of stock said to be equal to the county fair exhibitions for several years past. Rufus H. Smith, President; T. S. Gillett, Secretary; H. W. Barton, Treasurer.

ELLISBURGH, ADAMS AND HENDERSON, Jefferson County.—This is an old and flourishing Society, whose annual exhibitions have been equal to those of most county fairs in the State. The exhibition was held at Belleville, in September, and was of decided merit.

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Receipts,	$872 64
Expenditures,	529 94
	$342 70

T. S. Maxon, President; A. W. Ingraham, Secretary; John Clark, Treasurer.

Conewango, Cattaraugus County.—Annual fair at Rutledge, October 16; 131 entries, and the exhibition a very creditable one, being the first held by the association. Thomas J. Wheeler, President; Francis Treat, Secretary; Daniel W. Gardner, Treas.

Canaseraga, Allegany County.—This is a very successful society, and its fair on the 14th and 15th of October was a very encouraging one; and its officers and members are making active efforts to extend its usefulness. This society has held special meetings during the year, for familiar conversation on agricultural and kindred topics, which have added very much to the interest of the society. Sales of stock at the fair were entirely successful. The transactions of the Society have been published in pamphlet form, and will prove very useful. William M. White, President; W. B. Battin, Secretary; John N. Lemen, Treasurer.

Galen, Wayne, County.—This Society has been in successful operation for several years, and its last fair was one of much interest. Maynard Dayton, President; Thomas Plumtree, Treas.; G. W. Cowles, Secretary; Joseph Watson, Librarian.

Farmers' Club, Skaneateles.—This association was formed several years since, and its exhibitions have been of a very interesting character. W. I. Townsend, President; Chester Moses, Treasurer; W. M. Beauchamp, Secretary.

Farmers' and Gardeners' Club, Pomfret, Chautauque County.—This is a very spirited association, and its exhibition very encouraging. A. S. Moss, President; D. Risley, Vice President; E. Baker, Secretary and Treasurer.

Constantia, Oswego.—This Society is in successful operation, and is managed so as to contribute to the improvement of the farmers and mechanics. John W. Lyon, President; George W. Taft, Secretary; Levi Belknap, Treasurer.

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WOLCOTT UNION AGRICULTURAL SOCIETY, Wayne.—This is a new association, composed of active and enterprising farmers. E. N. Plank, President; Samuel Wells, Secretary; Z. Gould, Treasurer.

FARMERS' CLUB, Lewisboro, Westchester.—This is an association that is taking active measures to improve the agriculture of Westchester. Edward Lawrence, President; E. Lillie, Recording Secretary; Henry Keeler, Corresponding Secretary.

BEDFORD FARMERS' CLUB, Westchester.—This organization bids fair to do much good to the farmers and others of Bedford and its vicinity. John A. Howes, President; J. S. Holmes, Corresponding Secretary; Jared H. Green, Treasurer.

HARPERSFIELD, Delaware.—This is a very spirited Society, and its exhibition was most creditable to the members, and the stock would have done credit to any fair. C. J. Merriam, President; A. S. Gibbs, Secretary; S. H. Stevens, Treasurer.

VERNON AGRICULTURAL ASSOCIATION, Oneida.—Has held very successful fairs, and is composed of some of the most active and spirited farmers. Fitch Howes, President; L. T. Marshall, Secretary; J. Case, Treasurer.

TONAWANDA VALLEY AGRICULTURAL SOCIETY AND FARMERS' AND MECHANICS' ASSOCIATION.—E. Bishop, President; J. Folsom, Secretary; E. Colton, Treasurer. The fair of this Society was an excellent one, far exceeding, it is believed, the expectations of the most sanguine.

PHELPS AGRICULTURAL SOCIETY, Ontario.—This Society has been in operation several years, and its exhibitions have been very successful. E. Willard Frisbie, President; W. Dillon, Secretary; H. H. Frazer, Treasurer.

UNION AGRICULTURAL SOCIETY, Dundee, Yates.—Daniel Supplee, President; J. J. Diefendorf, Secretary; J. Rapalee, Teasurer.

FARMERS' CLUB,-Cleveland, Oswego.—Wm. Lyon, President; H. W. Dickinson, Secretary.

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WOOL GROWERS' ASSOCIATION.

The third Annual Fair was held at Penn Yan, in May. The entries on competition were unusually meritorious in grade and quality, and creditable to the wool-growers of Western New-York.

The exhibition was attended by gentlemen from all parts of the State, and elicited unusual interest. The exhibitors comparing views in relation to grades and breeds of sheep—communicating their experience in wool-growing, others receiving and imparting important instruction.

On the third and last day of the exhibition, the reports of committees were presented.

Fine Wooled Bucks.—Sweepstakes.

1st Premium, J. B. Harwood, Rupert, Vt.
2d do O. F. Marshall, Wheeler, Steuben.
3d do G. Cutting, Shoreham, Vt.
4th do P. Gardner, Potter, Yates.

Ewes.

1st Premium, A. Y. Baker, Urbana, Steuben.
2d do G. Cutting, Shoreham, Vt.
3d do Julius Stockney, do
4th do D. Z. Gibbs, do

Bucks, 3 years old.

1st Premium, O. Shepard, Urbana, Steuben.
2d do David Gray, Wheeler, do
3d do C. D. Champlin, Urbana, Steuben.

Bucks, 2 years old.

1st Premium, Julius Stickney, Vt.
2d do Wm. T. Remer, Yates.
3d do Joshua Rapalee,

Bucks, 1 year old.

1st Premium, G. Cutting, Vt.

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2d Premium, A. G. Baker, Steuben.
3d do J. Stickney, Vt.

Ewes, 2 years old.

1st Premium, O. Shepard, Steuben.
2d do G. Cutting, Vt.
3d do D. Z. Gibbs, Vt.

Ewes, 1 year old.

1st Premium, J. C. Taft, West Broomfield, Ontario.
2d & 3d do C. D. Chaplin and C. N. Ackerman, equally.

Five Ewes with Lamb.

1st Premium, O. Shepard, Urbana, Steuben.

Long Wooled Bucks.

1st Premium, Geo. Miller, Markham, C. W.
2d do do do do
3d do D. S. Peck, Benton, Yates.

Ewes.

1st Premium, Geo. Miller, C. W.
2d do D. S. Peck, Yates.
3d do J. H. Lapham, Yates,

Buck, 1 year old.

1st Premium, Geo. Miller, C. W.

Officers, 1857–8.—President, A. B. Dickinson, Hornby, Steuben, and 14 Vice-Presidents; Rec'g Sec'y, H. T. Brooks.

WM. T. REMER, *Treasurer.*

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AWARD OF PREMIUMS,

AT THE SIXTEENTH ANNUAL EXHIBITION, HELD AT WATERTOWN, JEFFERSON COUNTY, SEPTEMBER 30, AND OCTOBER 1, 2, 3, 1856.

CLASS I.—CATTLE.

No. 1. SHORT-HORNS—BULLS.

Thomas Gould, Aurora, Cayuga county, best bull, 3 years old and upwards, "Majesty," bred by Ambrose Stevens, Batavia, N. Y., (Silver medal to breeder,)..... $25

W. M. Bullock, Bethlehem, Albany county, 2d best do., "Prince of Wales,"..... 15

R. G. Coffin, Washington, Dutchess county, 3d best do., "Mortimer,"..... 5

Enoch Marks, Camillus, Onondaga county, best bull 2 years old, "Echo of Oxford,"..... 20

Francis M. Rotch, Morris, Otsego county, 2d best do., "Omer Pasha."..... 10

D. D. Campbell, Schenectady, best bull, 1 year old,..... 15

Gill & Brothers, Henderson, Jefferson county, 2d best do., "Bellmont,"..... 10

Amos F. Wood, Woodville, Jefferson county, best bull calf, "Belmont,"..... 5

Joseph E. Orvis, Massena, St. Lawrence county, 2d best do., "Barrington,"..... Trans. and 3

No. 6. SHORT-HORNS—BULLS, (IMPORTED.)

Hungerford, Brodie & Converse, Adams, Jefferson county, best bull 3 years old and upwards, "St. Nicholas,"..... $25

John W. Taylor, East Bloomfield, Ontario county, bull 'Nigill," highly commended as a very superior animal.

No. 1 A. SHORT-HORNS—COWS.

O. Howland, Auburn, Cayuga county, best cow 3 years old and upwards, "Blossom 2d,"..... $25

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J. E. Orvis, of Massena, St. Lawrence county, heifer "Beauty," 3 years old, and a 2 year old heifer, very good animals and worthy a premium, should pedigrees be produced—which were not submitted to the committee.

No. 6. SHORT-HORNS—COWS, (IMPORTED.)

Hungerford, Brodie & Converse, Adams, Jefferson county, best cow 3 years old and upwards, "Lady Newham,".... $25
Hungerford and Brodie, best heifer 2 years old,..... 20

HENRY WAGER, Oneida, *Chairman.*

No. 2. DEVONS—BULLS.

Wm. Johnson, Geneva, Ontario county, best bull 3 years old and upwards, bred by L. H. Colby, Groton, Tompkins county, (Silver medal to breeder,)..... $25
S. Burtis, Oaks Corners, Ontario county, 2d best do.,..... 15
N. M. Dart, North Harpersfield, Delaware county, 3d best do, 5
Jacob Brown, Varick, Seneca county, best bull 2 years old, 20
Milton G. Norton, Gouverneur, St. Lawrence county, 2d best do.,..... 10
E. G. Cook, Bellville, Jefferson county, best bull one year old, "Grand Duke,"..... 15
Jacob Brown, Varick, Seneca county, 2d best do,..... 10
R. H. Van Rensselaer, Morris, Otsego county, 3d best do, "Mercury,"..... 5
C. D. Bent, Sterling, Cayuga county, best bull calf, "Candy," 5
R. H. Van Rensselaer, Morris, Otsego county, 2d best do, "Mammon,".....Trans. and 3

No. 7. DEVONS—BULLS, (IMPORTED.)

R. H. Van Rensselaer, Morris, Otsego county, best bull 3 years old and upwards, "Megunticook,"..... $25

No 2. A. DEVONS—COWS.

Enoch Ottley, Phelps, Ontario county, best cow 3 years old and upwards, "Curley,"..... 25
R. H. Van Rensselaer, Morris, Otsego county, 2d best do., "Lilley,"..... $15
R. H. Van Rensselaer, Morris, Otsego county, 3d best do., "Fancy,"..... 5
S. Burtis, Oaks Corners, Ontario county, best heifer, 2 years old,..... 20

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E. G. Cook, Bellville, Jefferson county, 2d best do., "Fanny Forester,"..... $10
C. D. Bent, Sterling, Cayuga county, 3d best do., "Victoria," 5
R. H. Van Rensselaer, Morris, best heifer, 1 year old, "Nonsense,"..... 15
C. D. Bent, Sterling, Cayuga county, 2d best do., "Prude,"..... 10
Enoch Ottley, Phelps, 2d best do.,..... 5
R. H. Van Rensselaer, Morris, best heifer calf,..... 5
Enoch Ottley, Phelps, 2d best do.,.....Trans. and 3

No. 7. DEVONS—COWS, (IMPORTED.)

R. H. Van Rennselaer, Morris, best cow, 3 years old and upwards, "Lady Lightfoot,"..... $25

The committee highly commend "Nonpareil," exhibited by R. H. Van Rensselaer, as a very superb animal, and the premium awarded to "Lady Lightfoot," by the same exhibitor, as superior in her handling qualities, only—in other respects "Nonpareil" was her equal, and a silver medal is recommended.

"Leonora" and "Strawberry," the former exhibited by Mr. Van Rensselaer, the latter by C. D. Bent, of Sterling, Cayuga Co., are very superior animals, and a silver medal to each is recommended.

The committee say that the entries were very numerous and the animals very superior, and did credit to the exhibitors and to the Society. Mr. Van Rensselaer's herd was large and of very choice quality, and also the herds of C. D. Bent, of Cayuga county, J. W. Collins, of Sodus, Wayne county; J. R. Chapman, of Madison county; and Enoch Ottley, of Ontario county.

P. BARBER, Cortland *Chairman.*

No. 3. HEREFORDS.

A. & H. Bowen, jr., Oak Grove, Orleans county, best bull, 3 years old and upwards, bred by W. H. Sotham, (Silver medal to breeder,)..... $25
M. C. Remington, Sennett, Cayuga county, best bull, 2 years old,..... 20
M. C. Remington, Sennett, Cayuga county, best bull, 1 year old,..... 15
A. & H. Bowen, jr., Oak Grove, Orleans county, 2d best do., 10
A. & H. Bowen, jr., Oak Grove, Orleans county, 3d best do., 5

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A. & H. Bowen, jr., Oak Grove, Orleans county, best bull calf, ... $5
M. C. Remington, Sennett, Cayuga county, 2d best do., bred by W. H. Sotham, (Silver medal to breeder,)...Trans and 3
M. C. Remington, Sennett, Cayuga county, best cow, 3 years old and upwards,..... 25
A. & H. Bowen, jr., Oak Grove, Orleans county, 2d best do., 15
A. & H. Bowen, jr., Oak Grove, Orleans county, 3d best do., 5
M. C. Remington, Sennett, Cayuga county, best heifer, 2 years old,..... 20
M. C. Remington, Sennett, Cayuga county, best heifer, 1 year old,..... 15
A. & H. Bowen, jr., Oak Grove, Orleans county, 2d best do., 10
M. C. Remington, Sennett, Cayuga county, 3d best do.,.... 5
M. C. Remington, Sennett, Cayuga county, best heifer calf,. 5
M. C. Remington, Sennett, Cayuga county, 2d best do., Trans. and 3

No. 8. HEREFORDS, (IMPORTED.)

Geo. Clarke, East Springfield, Otsego county, best bull, 3 years old and upwards,..... $25

The committee desire to bring to notice four Hereford grade cows, presented for exhibition only, by Geo. Clarke, Esq., East Springfield, Otsego county. They are a cross from the native cow and the Hereford bull, so often repeated on the progeny as to leave those exhibited within 1-16 of being thorough-bred Herefords. They are extraordinary fine animals, and have arrived at a wonderful degree of fatness, although fed, as Mr. Clarke assured the Judges, on poor pasture. We recommend a discretionary premium—Silver medal.

A. CAMERON, Kingston, Can. West, *Chairman.*

No. 4. AYRSHIRES.

E. P. Prentice, Albany, best bull, 3 years old and upwards, "Dundee 5th,"..... $25
Lyman R. Lyon, Lyon's Falls, Lewis county, 2d best do.,... 15
H. F. Humphrey, Brownville, Jefferson county, 3d best do., 5
E. P. Prentice, Albany, best bull, 1 year old, "Duke,"..... 15
Hungerford, Brodie & Converse, Adams, Jefferson county, best bull calf,..... 5
E. P. Prentice, Albany, 2d best do., "Dandy 6th," Trans. and 3

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E. P. Prentice, Albany, best cow, 3 years old and upwards, "Tibby,"..... $25
James F. Converse, Belleville, Jefferson county, 2d best do., 15
Hungerford & Brodie, Adams, best heifer, 2 years old,..... 20
do do 2d best do., "Flora,"..... 10
E. P. Prentice, Albany, 3d best do., "Maggie,"..... 5
do do best heifer, 1 year old, "Peggy,"... 15
Hungerford & Brodie, Adams, 2d best do.,..... 10
E. P. Prentice, Albany, best heifer calf, "Dolly,"..... 5
Hungerford & Brodie, Adams, 2d best do.,.....Trans. and 3

No. 10. AYRSHIRES, (IMPORTED.)

Hungerford, Brodie & Converse, Adams, bull, 3 years old and upwards, "Kilburn," certificate as best bull, having received, heretofore, 1st premium.
Hungerford & Brodie, Adams, best cow, 3 years old and upwards, ... $25
Hungerford & Brodie, Adams, best heifer, 2 years old,..... 20

The committee, in addition to the animals to which premiums were awarded, desire to call the attention of the Executive Committee to three imported Ayrshire cows, exhibited and owned by Messrs. Hungerford & Brodie, as beautiful animals of their kind —discretionary premium recommended—Silver Medal.

A. CAMERON, Kingston, Can. West, *Chairman.*

No. 19. ALDERNEYS, (IMPORTED.)

E. P. Prentice, Albany, best bull, 1 year old,..... $15
do do do cow, 3 do 25

No. 11. GRADE CATTLE.

C. Baker, Batavia, Genesee county, best cow, 3 years old and upwards,..... $25
Mason Salisbury, Ellisburgh, Jefferson, 2d best do.,..... 15
J. W. Collins, Sodus, Wayne county, 3d best do.,..... 5
Gill & Brothers, Henderson, Jefferson county, best heifer, 2 years old,..... 20
Gill & Brothers, Henderson, Jefferson county, 2d best do.,.. 10
Amos F. Wood, Woodville, Jefferson county, 3d best do.,... 5
Gill & Brothers, Henderson, best heifer, 1 year old,..... 15
Amos F. Wood, Woodville, 2d best do.,..... 10
John Collins, Le Ray, Jefferson county, 3d best do.,..... 5

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Mason Salisbury, Ellisburgh, Jefferson county, best heifer calf, $5
Amos F. Wood, Woodville, 2d best do.,.....Trans. and 3

No. 12. NATIVES.

Austin Harris, Watertown, Jefferson county, best cow, 3 years old and upwards,..... $25
H. F. Humphrey, Brownville, 2d best do.,..... 15
R. D. Murray, Watertown, 3d best do.,..... 5
A. M. Rogers, Watertown, best heifer, 2 years old,..... 20
Truman Hungerford, Watertown, best heifer, 1 year old,... 15
Truman Hungerford, Watertown, 2d best do.,..... 10
H. F. Humphrey, Brownville, 10 ordinary dairy cows,..Vol. Trans.

No. 13. WORKING OXEN.

Hiram Converse and others, Jefferson county, best 20 yoke of oxen,..... $50
A. B. Carter and others, Champion, Jefferson county, 2d best 10 yoke of oxen from any town,..... 20
Abner Fitch, Westmoreland, Oneida county, best single yoke of oxen,..... 20
Mason Salisbury, Ellisburgh, 2d best do.,..... 15
George Clarke, Springfield, Otsego county, 3d best do.,.... 5

No. 14. STEERS—3 YEARS OLD.

Ottley & Oaks, Phelps, Ontario county, best yoke,..... $10
George Chamberlain, Ellisburgh, 2d best do.,..... 8
Charles B. Eastman, Woodville, 3d best do.,....Trans. and 3
Franklin, son of Jeremiah Parker, first premium for training steers,.....Silver Medal.

No. 15. STEERS—2 YEARS OLD.

Charles B. Eastman, Woodville, best single yoke,..... $10
James F. Converse, Belleville, 2d best do.,..... 8
William L. Wait, Champion, Jefferson county, 3d best do., Trans. and 3
Training steers best, William L. Wait,.....Siver Medal.

ONE YEAR OLD.

Datus Osmer, Rutland, Jefferson county, best single yoke,.. $8
A. & H. Bowen, jr., Oak Grove, Orleans county., 2d best do., 5
Amasa N. Converse, 12 years old, Pamelia, Jefferson county, training yoke of steers best,.....Silver Medal.

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Discretionary Premium,

Of $10, and a volume of Transactions, to John W. Taylor, of East Bloomfield, Ontario county, for two pair of unbroken yearling steers, very fine animals.

No. 17. FAT CATTLE.

John W. Taylor, East Bloomfield, best ox, 4 years and under 5 years, ... $10
Henry Hopkins, Rutland, 2d best cow, 4 years, ... 6
John W. Taylor, East Bloomfield, best steer, 3 years old, .. 8
John W. Taylor, East Bloomfield, best heifer, 3 years old, .. 8
John W. Taylor, East Bloomfield, 2d best do., ... 3

Discretionary.

E. Corning, jr., Albany, a prize of $10, and Diploma, for a six years old Hereford cow, fed on meal one year—the best animal exhibited, the finest the committee have ever seen entered for exhibition.

No. 18. FOREIGN CATTLE.

Wm. Davis, Toronto, C. W., best Short Horn bull, 2 years and upwards, ... Diploma and $15
R. Coates, Oakville, C. W., best Devon bull, 2 years and upwards, ... Dip. and 15
H. A. Sandusky, Versailles, Ky., best pair of working oxen out of State, ... 15
H. A. Sandusky, 2d best do., ... 10
W. Roderick, Coburgh, C. W., Black Galloway bull, .. Dip. and 10

CLASS II.—HORSES.

No. 19. FOR ALL WORK—STALLIONS.

Truman Cone, Denmark, Lewis county, best stallion, 4 years and upwards, ... $25
R. McNeal, Meridian, Cayuga county, 2d best do., ... 15
E. G. Wait, Antwerp, Jefferson county, 3d best do., ... 5
A. & H Bowen, jr., Oak Grove, Orleans county, 4th best do., Youatt.

The committee beg leave to report that the horses presented for our examination were a very fine lot: that in addition to those to which we have awarded premiums, there were some very fine "Black Hawk" studs, from the counties of St. Lawrence and Essex.

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We recommend that the Society award premiums to Messrs. Warner & Healey, Canton, St. Lawrence county, for their stallion, which was accompanied by 6 or 8 of his colts,.. Silver Medal.

To Edwin O. Phelp, Hopkinton, St. Lawrence county,..S. S. Medal.
Norman Dayton, Canton, St. Lawrence county,.....Youatt.
E. D. Jackson, Canton, St. Lawrence county,.....Trans.

They being a fine lot of studs—but your committee think that they should not be placed in the class of horses of all work, and recommend that such horses should be placed in a class for light and pleasure carriages, believing them not suitable for staging or heavy farm work.

ELA MERRIAM, *Chairman.*

No. 19. FOR ALL WORK—MARES AND FOALS.

A. Blount, Watertown, Jefferson county best brood mare, (with foal at her feet,) 4 years and upwards,..... $25
Stephen Adsit, Rutland, Jefferson county, 2d best do.,..... 15
Lyman Jacobs, Rutland, Jefferson county, 3d best do.,..... 5
A. B. Carter, Champion, Jefferson county, 4th best do., ..Youatt.
Henry Ainsworth, Quaker Settlement, Jefferson county....Trans.

No. 20. DRAUGHT.

John G. Hermans, Fairville, N. Y., best stallion, 4 years and upwards, ... $25
Charles Peck, Van Buren, N. Y., 2d best do., ... 15
R. McNeal, Meridian, N. Y., 3d best do.,..... 5
Anson Hungerford, Watertown, 4th best do., ...Youatt.

Discretionary.

Anson Hungerford, Watertown, Jefferson county, best pair of mares for all work,..... $10
H. L. Monroe, Rutland, 2d best pair of horses, ... 5
W. D. Carter, Champion, 3d best do.,.....Youatt.

No. 21. THOROUGH-BRED.

George W. Parish, Rossie, St. Lawrence county, best stallion, 4 years and upwards, "Colonel," $25
Henry D. Rich, Watertown, Jefferson county, 2d best do., "Hamiltonian,"..... 15
John H. Hawthorne & Co., Utica, Oneida county, 3d best do., 3 years, "Young Kimball Jackson,"..... 10

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No. 22. 3 YEARS OLD.

Gardner A. Childs, Malone, Franklin county, best stallion, 3 years old, ... $20
E. Warner, Canton, St. Lawrence county, 2d best do., ... 10
Thomas Crary, Potsdam, St. Lawrence county, 3d best do., . 3
Pliny Monroe, Rutland, Jefferson county, 4th best do., ..Youatt.
Jesse Stapelin, Rutland, Jefferson county, best mare, 3 years old, ... $20
Truman Hungerford, Watertown, Jefferson county, 2d best do. 10
Thurston Barker, Ellisburgh, Jefferson county, 3d best do., . 3
H. L. Pierce, Champion, Jefferson county, 4th best do., ..Youatt.

No. 23. 2 YEARS OLD.

George Benedict, Verona, Oneida county, best stallion, 2 years old, ... $15
W. Hungerford, Watertown, 2d best do., ... 10
Charles Wheeler, Canton, St. Lawrence county, 3d best do., Youatt.
A. C. Pierce, Orleans, Jefferson county, best mare, 2 years old, ... $15
Wm. C. Baker, Watertown, Jefferson county, 2d best do., .. 10
Leonard Loomis, Le Ray, Jefferson county, 3d best do.,..Youatt.

No. 24. 1 YEAR OLD.

Sylvanus Stroud, Lenox, Madison county, best stallion, 1 year old, ... $10
M. Craine, Westmoreland, Oneida county, 2d best do., ... 5
F. H. Kent, Hopkinton, St. Lawrence county, 3d best do., Youatt.

Discretionary.

John M. Cooper, Watertown, Jefferson county, 1 pair of bay matched 2 year old colts, ...Trans.

No. 25. MATCHED HORSES—FOR ROAD OR CARRIAGE.

J. W. Bostwick, Lowville, best pair of matched horses, 16 hands and over, ... $15
Harvey Beals, Adams, Jefferson county, 2nd best do., ... 10

No. 26. MATCHED HORSES—FOR ROAD OR CARRIAGE.

Erastus Corning, Jr., Albany, best pair of matched horses, 15 to 16 hands, ... $15
E Burrell, Salisbury, Herkimer county, 2d best do., ... 10

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No. 27. MATCHED HORSES—FOR ROAD OR CARRIAGE.

Edwin Marsh, Henderson, Jefferson county, best pair of matched horses, 14 to 15 hands, ... $15
C. S. Clark, Oswego, 2d best do., ... 10

No. 29. GELDINGS.

Chauncy Barrett, Henderson, Jefferson county, best gelding, $10
Calvin Scripture, Watertown, Jefferson county, 2d best do., 8

No. 30. SINGLE MARES.

Harvey Beals, Adams, Jefferson county, best (gray mare), .. $10
J. Stears, Jr., Watertown, 2d best do., (bay mare), ... 8

No. 31. SINGLE TROTTING HORSE, MARE OR GELDING—IN HARNESS.

Geo. White, Canton, St. Lawrence county, best, (brown horse) $10
J. B. Champion, Watertown, Jefferson county, 2d best do., (sorrel horse), ... 8
C. C. Chadwick, Theresa, Jefferson county, 3d best do., ... 5
Maj. M. R. Patrick, Sackett's Harbor, Jefferson county, best trained riding horse, for gentleman or lady, ... 10
H. S. Bowteel, Leyden, Lewis county, 2d best do, ... 8
E. H. Cole, Henderson, Jefferson county, 3d best do., ... 5

No. 32. FROM OTHER STATES AND CANADA.

R. Coates, Oakville, C. W., best blood stallion, 4 years and upwards, ... $15
A. C. Palmer, Charlotte, Chittenden county, Vt., best stallion horse of all work, 4 years and upwards, ... 15
Henry Batelle, Grafton, C. W., best brood mare of all work, 4 years and upwards, ... 15
Peter Arch Deacon, Toronto, C. W., best draught stallion of all work, 4 years and upwards, ... 15
W. H. Gardner, Morvin, C. W., a good 2 year old colt, ... Trans.
Jas. P. Lake, Morvin, C. W., a good 3 year old colt, ... Trans.

CLASS III.—SHEEP, SWINE, POULTRY.

No. 34.—FAT SHEEP.

John McDonald, Warren, Herkimer county, best fat sheep, long wooled, 2 years and upwards, ... $5
Wood & Eastman, Woodville, Jefferson county., 2d best do., 3
John McDonald, Warren, Herkimer county, best long wooled under 2 years, ... 5

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John McDonald, Warren, Herkimer county, best middle wooled, 2 years and upwards,..... $5
John McDonald, Warren, Herkimer county, 3d best do. under 2 years,.....Morrell's Shepherd.
Wood & Eastman, Woodville, Jefferson county, 2d best cross-breed, 2 years and upwards,..... 3

No. 35.—LONG WOOLED.

John McDonald, Warren, Herkimer county, best buck, 2 years and upwards,..... $10
Hungerford & Brodie, Adams, Jefferson county, 2d best do., 8
do do do do 3d do 5
do do do do best buck under 2 years, 10
do do do do 2d do 8
do do do do 3d do 5
do do do do best pen 5 ewes, 2 years and upwards, 10
do do do do 3d do 8
John McDonald, Warren, Herkimer county, 3d do 5
Hungerford & Brodie, Adams, Jefferson county, best pen, 5 ewes under 2 years,..... 10
John R. Chapman, Oneida Lake, Madison county, do.,..... 8
Hungerford & Brodie, Adams, Jefferson county, best pen 3 buck lambs,..... 5
John McDonald, Warren, Herkimer county, 2d do.,..... Morrell's Shepherd.
do do do best pen 3 ewe lambs, 5
J. F. Converse, Bellville, Jefferson county, 2d do,..... Morrell's Shepherd.
Alfred Chamberlain, Camden, Oneida county, a ewe and 4 lambs born at one birth,.....Trans. and 3

No. 36.—MIDDLE WOOLED.

Thomas Betts, New-York city, best buck 2 years and upwards, $10
G. B. Wright, Henderson, Jefferson county, 2d do.,..... 8
E. Corning, Jr., Albany, 3d do,..... 5
O. Howland, Auburn, best buck under 2 years,..... 10
E. G. Cook, Bellville, Jefferson county, 2d do,..... 8
do do do do 3d do,..... 5

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E. G. Cook, Bellville, Jefferson county, best pen 5 ewes 2 years and upwards,..... $10
E. Corning, Jr., Albany, 2d do,..... 8
G. B. Wright, Henderson, Jefferson county, 3d do,..... 5
Thomas Betts, New-York city, best pen 5 ewes under 2 years, 10
E. G Cook, Bellville, Jefferson county, 2d do.,..... 8
G. B. Wright, Henderson, Jefferson county, best pen 3 buck lambs,..... 5
G. B. Wright, Henderson, Jefferson county, best pen 3 ewe lambs,..... 5

No. 37.—MERINOES.

J. & A. Dike, Depeyster, St. Lawrence county, best buck 2 years and upwards,..... $10
N. M. Dart, North Harpersfield, Del., 2d do.,..... 8
E. G. Cook, Bellville, Jefferson county, 3d do.,..... 5
N. M. Dart, North Harpersfield, Del., best buck under 2 years,..... 10
J. & A. Dike, Depeyster, St. Lawrence county, 2d do.,..... 8
E. G. Cook, Bellville, Jefferson county, 3d do,..... 5
N. M. Dart, North Harpersfield, Del., best pen 5 ewes 2 years and upwards,..... 10
J. & A. Dike, Depeyster, St. Lawrence county, 2d do,..... 8
E. G. Cook, Bellville, Jefferson county, 3d do,..... 5
N. M. Dart, North Harpersfield, Del., best pen 5 ewes under 2 years,..... 10
J. & A. Dike, Depeyster, St. Lawrence county, 2d do,..... 8
N. M. Dart, North Harpersfield, Del., best pen 3 buck lambs, 5
E. G. Cook, Bellville, Jefferson county, 2d do,...Morrell's Shep.
N. M. Dart, North Harpersfield, Del., best pen 3 ewe lambs, 5
J. & A. Dike, Depeyster, St. Lawrence county, 2d do,..... Morrell's Shepherd.

No. 38. SILESIAN MERINOES.

E. G. Cook, Bellville, Jefferson county, best buck, 2 years and upwards,..... $10

No. 39. FRENCH MERINOES.

Green & Maxon, Adams, Jefferson county, best buck, 2 years and upwards,..... $10
E. G. Cook, Bellville, Jefferson county, 2d do.,..... 8

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Milton G. Norton, Gouverneur, St. Lawrence county, 3d best buck, 2 years and upwards, ... $5
Green & Maxon, Adams, Jefferson county, best buck under 2 years, ... 10
E. G. Cook, Bellville, 2d do., ... 8
E. G. Cook, Bellville, Jefferson county, best pen 5 ewes, 2 years and upwards, ... 10
E. G. Cook, Bellville, Jefferson county, 2d do., ... 8
do do do best do under 2 y'rs, 10
do do do best pen 3 buck lambs, ... 5
E. G. Cook, Bellville, Jefferson county, best pen 3 ewes, do., 5

No. 40. SAXONS.

Green & Maxon, Adams, Jefferson county, 2d best buck, 2 years and upwards, ... $8
Green & Maxon, Adams, Jefferson county, 3d do., ... 5
do do do 2d do under 2 y'rs, 8
do do do best pen 5 ewes 2 years and upwards, ... 10
Green & Maxon, Adams, Jefferson county, 2d do., ... 8
do do do best pen 5 ewes under 2 years, ... 10
Green & Maxon, Adams, Jefferson county, 2d best pen 3 buck lambs, ... Morrell's Shepherd.
Green & Maxon, Adams, Jefferson county, best pen 3 ewe lambs, ... 5
Green & Maxon, Adams, Jefferson county, 2d do., Morrell's Shep.

No. 41. CROSS-BREED OF FINE WOOL, SAXON AND MERINOES.

E. G. Cook, Bellville, Jefferson county, best buck 2 years and upwards, ... $10
G. W. Collins, Watertown, Jefferson county, 2d do., ... 8
O. Howland, Auburn, Cayuga county, 3d do., ... 5
E. G. Cook, Bellville, best buck under 2 years, ... 10
O. Howland, Auburn, Cayuga co., 2d best buck under 2 y'rs, 8
G. W. Collins, Watertown, Jefferson county, best pen 5 ewes 2 years and upwards, ... 10
E. G. Cook, Bellville, Jefferson county, best pen 3 buck lambs, ... 5
O. Howland, Auburn, Cayuga county, 2d do., ... Morrell's Shep.

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G. W. Collins, Watertown, Jefferson county, best pen 3 ewe lambs,..... $5
E. G. Cook, Bellville, Jefferson county, 2d do.,...Morrell's Shep.

No. 42. CROSS-BREED OF COARSE OR MIDDLE WOOL.

O. Howland, Auburn, Cayuga county, best buck 2 years and upwards, ... $10
J. R. Chapman, Oneida lake, Madison county, 2d do.,..... 8
Austin Eastman, Bellville, Jefferson county, best buck under 2 years,..... 10
John Dack, Ellisburgh, Jefferson county, 2d do ,..... 8
Wood & Eastman, Woodville, Jefferson county, best pen 5 ewes 2 years and upwards, ... 10
George Webb, Pamelia, Jefferson county, 2d do..... 8
Wood & Eastman, Woodville, best pen 5 ewes under 2 years, 10
George Webb, Pamelia, best pen 3 ewe lambs,..... 5
Wood & Eastman, Woodville, Jefferson county, 2d do., Mor. Shep.

Discretionary.

Jesse Stapelin Rutland, Jefferson county, a ewe with 4 lambs born at one birth,..... Dip.

No. 43. FROM OUT OF THE STATE.

C. A. Jordison, Port Hope, C. W., long wooled, best buck,.. $10
John Spencer, Whitby, C. W., middle do.,..... 10

No. 44. FROM OUT OF THE STATE

Wm. Roderick, Coburg, C. W., a fine Cheviot buck, worthy of notice,..... Silver Medal.
John Spencer, Whitby, C. W., fat sheep, ...Silver Medal.

SWINE.

No. 45. LARGE BREED.

Hungerford & Brodie, Adams, Jefferson county, best boar 2 years old and upwards,..... $10
Wm. Richey, Watertown, Jefferson county, 2d best boar 1 year old and upwards, ... 5
Hungerford & Brodie, Adams, Jefferson county, best boar 6 months and under 1 year,..... 8
Hungerford & Brodie, Adams, Jefferson county, best breeding sow 1 year old,..... 10
Truman Hungerford, Adams, Jefferson county, 2d do.,..... 5

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Hungerford & Brodie, Adams, Jefferson county, best sow, 6 months and under 1 year,..... $8
Albert Horr, Watertown, Jefferson county, best lot of pigs, not less than 5 months, under 10 months,..... 8

SMALL BREED.

A. P. Sigourney, Watertown, Jefferson county, 2d best boar, 2 years old and upwards, Suffolk, ... 5
A. B. Conger, Haverstraw, Rockland county, do, 1 year old and upwards, do., ... 10
E. G. Cook, Bellville, Jefferson county, 2d do., do.,..... 5
Green & Maxon, Adams, Jefferson county, best boar 6 months and under 1 year old, Suffolk,..... 8
A. B. Conger, Haverstraw, Rockland county, best breeding sow 1 year old, Suffolk,..... 10
E. G. Cook, Bellville, Jefferson county, 2d do.,..... 5
Green & Maxon, Adams, Jefferson county, best lot of pigs not less than 5, under 10 months, Suffolk, ... 8

OUT OF STATE.

R. Coates, Oakville, C. W., best boar under 1 year old,..... 8
C. A. Jordison, do do sow do 8

No. 46. POULTRY.

D. S. Heffron, Utica, best gray or speckled dorkings,..... 3
H. B. Hurlburt, Watertown, Jefferson county, 2d do.,..... 2
D. S. Heffron, Utica, best lot black Spanish,..... 3
James McMin, Pamelia, Jefferson county, do., Leghorn, ... 3
F. Lansing, Watertown, do 2d do., ... 2
D. S. Heffron, Utica, best lot game, (Earl Derby,)..... 3
do do do Sumatra,..... 3
Charles Brook, Watertown, Jefferson county, 2d do common, 2
Samuel Herrick, do do best lot of buff Shanghai,..... 3
Charles Brook, Watertown, Jefferson county, 2d do., ... 2
E. G. Cook, Bellville, Jefferson county, best lot large do. 3
G. W. Jenks, Watertown, do best Brahmas,..... 3
F. R. Farwell, Watertown Jefferson county, 2d best spotted, 2
O. Howland, Auburn, 2d best lot China, ... 2
D. S. Heffron, Utica, best lot gold lace bantams, ... 3
do do do silver do., ... 3

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F. R. Farwell, Watertown, Jefferson county, best lot of any variety,..... $3
Augustus R. Wright, Adams, Jefferson county, 2d do.,..... 2
D. S. Heffron, Utica, best lot African,..... 3
Charles Brook, Watertown, Jefferson county, best lot of Leghorn,..... 3
B. F. Hotchkin & Co., Watertown, Jefferson county, 2d do., Spotted China,..... 2
H. Converse, Pamelia, Jefferson county, best lot of native or dunghill fowls,..... 3

TURKIES.

Mason Salisbury, Ellisburgh, Jefferson county, best pair turkies,..... 3
M. B. Scoville, Hounsfield, Jefferson county, 2d do.,..... 2

DUCKS.

O. Howland, Auburn, best pair Muscovy,..... 3
D. S. Heffron, Utica, best do Mallard,..... 3
do do best pair Aylesbury,..... 3
do do do Rouen,..... 3
G. W. Collins, Watertown, Jefferson county, do top knots,.. 3
Morgan Watkins, Pamelia, do do common,.... 3
Hiram Converse, do do 2d do do 2

GEESE.

D. S. Heffron, Utica, best pair Bremen,..... 3
O. Howland, Auburn, 2d do do 2

GUINEA FOWLS.

Hiram Converse, Pamelia, Jefferson county, best lot,..... 3
G. W. Collins, Watertown, Jefferson county, 2d do,..... 2

PEA FOWLS.

J. R. Adams, Brownville, Jefferson county, best lot,..... 3

PIGEONS.

D. S. Heffron, Utica, best and greatest variety,..... 3

BEST EXHIBITION OF POULTRY OWNED BY EXHIBITOR.

D. S. Heffron, Utica, best lot,..... 8

RABBITS.

D. S. Heffron, Utica, best pair long eared,..... 3
A. M. Woodward, Rutland, best pair common,..... 3

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Samuel Wilson, Watertown, 2d best pair common, ... $2
P. O. Williams, Watertown, 1 large golden eagle, S. Silver Medal.

CLASS IV.

No. 47. PLOWING MATCH.

George W. Collins, Watertown, Jefferson county, 1st prem., $10
Robert Cotton, Rutland, do 2d do 8
Amos Phillips, Copenhagen, Lewis county, 3d do
John Pierce, plowman, ... 6
Robert Newton, South Canton, St. Lawrence county, 4th premium, ... 4
Wm. L. Eddy, Pamelia, Jefferson county, 5th do, ... 2
Thomas Graham, Rutland, do 6th do, ...Trans.

BOYS UNDER EIGHTEEN YEARS OF AGE.

Wm. N. Cole, 13 years old, Brownville, Jefferson county, 1st premium, ... $10

No. 48. SPADING MATCH.

Stephen Grimes, Watertown, Jefferson county, best spading, $10
Patrick Farrell, do do 2d do., ... 8
Nicholas McCaba, do do 3d do., Silver Medal.

No. 49. FARM IMPLEMENTS, No. 1.

J. E. Morgan, Deerfield, Oneida county, best farm wagon, $5
do do do best harrow, ... 5
Andrew Crosier, Albion, Oswego county, 2d do, ... 3
J. S. & M. Peckham, Utica, best corn cultivator, ... 5
do do 2d do, ... 3
J. A. Krake, Alden, Erie county, best fanning mill, ... 5
Richard H. Pease, Albany, 2d do, ... 3
J. C. Rich, Penfield, Monroe county, best corn stalk cutter, 5
E. Little & Co., Syracuse, Onondaga county, 2d do, ... 3
J. B. Wright & Co., Westfield, Chautauque county, best corn and cob crusher, by horse power, ... 5
American Mill Company, Troy, 2d do, ... 3
Finlay Fraser, Trenton, Oneida county, best horse cart for farm, ... 5
Hungerford & Brodie, Adams, Jefferson county, 2d best horse cart and harness for farm, ... 3
W. L. Eddy, Pamelia, Jefferson county, best roller exhibited for general use, a premium is recommended, ... 1
E. & T. Fairbanks & Co., model horse rake, ...Trans.

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No. 50. FARM IMPLEMENTS, No. 2.

M. H. Lines, Utica, best carriage harness,..... $5
do do 2d do 2
do do best single harness,..... 5
S. H. Kimball, Clinton, Rensselaer county, 2d do..... 2
M. H. Lines, Utica, best harness for general purposes,..... 5
G. S. Sackett, Cape Vincent, best ladies' riding saddle,..... 5
Henry Holmes, Grafton, Vt., best churn,..... 5
Burnham and Hubbard, Cortlandville, Cortland co., 2d do, 2
Charles Taylor, Little Falls, best cheese press,..... 5
George R. Comstock, Little Falls, 2d do,..... 2
H. Cooper & Co. Watertown, best 12 milk pans,..... 3
do do best grain cradle,..... 3
do do 2d do,..... 2
Adams Manufacturing Company, Adams, Jefferson county, best 6, hay, barley and manure forks,..... 3
T. Y. Washburn, Chenango county, best 6 hoes, (good hoes,) S. Silver Medal.
D. Duncan, Adams, Jefferson county, best lot grain measures, 3
H. Cooper & Co., Watertown, Jefferson county, best curd cutter, strainer pail, milk vat, and Thermometer churn, Silver Medal.

No. 51. FARM IMPLEMENTS, No. 3.

E. D. Halleck, Rochester, 2d best portable saw-mill, (this machine is well adapted to farm purposes, combining a circular, long saw and boring apparatus,)..... $8
Thomas D. Burrall, Geneva, Ontario county, best corn sheller, hand power,..... 6
E. P. Pratt, Oakhill, Greene county, 2d do, (Adam's patent,) 4
Daniel Wait, Pamelia, Jefferson county, best portable grist mill—(the committee consider this mill most durable, operated with least power, and least liable to get out of order) 8
Richard H. Pease, Albany, 2d do, (this is a new invention not yet tested by time, of which the committee think favorable,)..... 6
Cowing & Co., Seneca Falls, best pump for farm use, (recommended, being readily changed from a common to a force pump,) with hose attached,..... 5

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E. G. Potter, Scott, Cortland county, best arrangement for raising water other than pump, a very curious mode of raising water from an open well, with two self-discharging buckets, ... $5

H. Cooper & Co., Watertown, best and most numerous collection agricultural implements, ... 25

Ira Carter, Malone, Franklin county, iron oscillating force pump, (this the committee did not consider as strictly under their jurisdiction, as not adapted to farm purposes, but would recommend it as a powerful force pump, well adapted to mill and other purposes,) ..... Vol. Trans.

Troy Portable Grain Mill Company, Fellows' portable grist mill, (this mill the committee consider worthy the attention of the farmer, capable of making meal for family use or for feeding, and also adapted to crushing the cob, recommend, ... Vol. Trans.

No. 52. A. STEAM ENGINES.

For a steam engine, (portable) 4 boiler, with cooking apparatus attached, of excellent workmanship and economy of space, A. N. Wood & Co., Eaton, Madison county, ... S. Medal.

For 2 stationary engines and boilers, of first class workmanship, very compact and of low cost, Goulding, Badgely & Sewall, Watertown, ... Silver Medal.

For a portable steam engine and portable steam saw mill, a really valuable and new invention for clearing land and road building, the committee award the highest premium in their gift, to Fairbanks, Wilmot & Co., New-York-City, 343 Broadway, ... Silver Medal & Dip.

For a large collection of steam engines and boilers, especially adapted for the use of farmers and mechanics—the large number of 700 which Messrs. H & Sons have disposed of, is the best evidence, in the opinion of the committee of their great practical value—Hoard & Sons, Watertown, S. Medal.

For a very fine working model of an oscillating engine, the committee award J. W. Forsyth & Son, Cape Vincent, .. Dip.

Hoard & Sons, Watertown, the Ex. Committee award for the splendid display of steam engines and machinery in operation on the grounds, and which added greatly to the interest of the exhibition ..... The Society's Gold Medal.

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The committee are much gratified at the continued improvement being made in the manufacture of steam engines and boilers, especially adapted to the use of farmers, and think that the day is not far distant when the steam engine will be considered as secondary only to the plow.

CHAS. VAN BENTHUYSEN, Albany, *Chairman.*

"Rotary Digger or Terracultor," entered by O. C. Evans, of Ohio. A special committee, Hon. A. B. Conger, Hon. Geo. Geddes, Hon. Geo. Brayton, was appointed to examine the above machine, and the same was tested in a field adjoining the show grounds. This is a new implement, designed instead of the plow, to prepare the ground for the farmer and it is hoped may be made available for the use of the practical farmer. The machine was drawn by two yoke of oxen, and operated upon the ground to the depth of nine inches, and in a belt of about four feet in width.

No. 52. MACHINERY.

J. & G. Lord & Co., Watertown, best cast steel plow,... S. Med.
Wm. Deering, Albany, best hay press,..... S. Med.
R. H. Pease, Albany, best horse power,..... S. Med.
A. Meneely's Sons, West Troy, best chime of bells,..... Dip.
Jones & Hitchcock, Troy, best church bell, ... Dip.
A. Meneely's Sons, West Troy, best steamboat bell,..... Dip.
do do best locomotive bell,..... Dip.
Otis & Yale, Watertown, best hydraulic ram,..... S. Med.
J. & G. Lord & Co., Watertown, best collection and assortment of plows in use,.....Dip. and S. Med.
Isaac Wait, Pamelia, Jefferson county, Van Valkenburgh's rotary grain separator,..... Dip.
D. R. Cook, Brownville, Jefferson county, cast iron roofing, S. S.M.
N. B. Lord, Brownville, Jefferson county, Turbine water wheel,..... S. S. M.
J. H. Jones, Rockton, Ill., corn planting machine,..... S. S. M.
Amos Philips, Copenhagen, Lewis county, steel plow,.. S. S. M.
Samuel Hurlbut, Ogdensburgh, plow, convex mold board and spring draft attached,..... Dip.
A. Kendall, Cleveland, Ohio, Kendall's double acting shingle machine, ... Dip.
A. H. Robbins, Copenhagen, Lewis county, seed planter,..Trans

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D. W. Seeley, Albany, Scott's patent shingle machine for cutting and jointing shingles, ... S. S. M.
H. W. Angel, Taberg, Oneida county, shingle machine,. S. S. M.
J. Van Brocklin, Middleport, Niagara county, improved bolt, rivet and spike machine,..... S. S. M.
A. Barton, Syracuse, reversible plow,..... Dip.
A. D. Stowell, Fulton, Oswego county, spoke-set and tenoning machine,..... Trans.
E. & T. Fairbanks & Co., St. Johnsburg, Vt., assortment of scales,..... Dip.
D. M. Smyth, Albany, patent platform scales,.. Dip and S. Med.
Chaney & Co., Ogdensburgh, F. Hurlbert's patent convex plow,..... Dip.
DeWitt Rogers, Deep River, Lewis county, steel plow,... Trans.
Henry Tarbox, Seneca Falls, gang plow, ... Dip.
G. C. Dolph, West Andover, Ashtabula county, Ohio, (model) Ball's Ohio mower,..... Dip.
J. B. Smith, Sandy Creek, Oswego county, leather belting,. Report Patent Office.
Henry Howard, Watertown, cheese steamer,..... S. S. M.
J. W. Freiot, Bainbridge, Chenango county, Morgan's herd grass and clover seed sower,..... Trans.
R. H. Pease, Albany, cider and wine mill,..... S. S. M.
F. A. Gleason, Rome, Oneida county, dovetailing machine, S. S. M.
Wheeler, Melick & Co., Albany, by H. Cooper & Co., Watertown, combined thrasher and winnower,..... S. Med.
Geo. Westinghouse, Schenectady, thrasher and separator, S. Med.
G. D. Harris, Fitchburg, Mass., stump machine, (model,) S. Med.
R. L. Howard, Buffalo, Ketchum's combined reaper and mower, Dip.
R. L. Allen, by H. Cooper & Co., 191 Water st., N. Y., Allen's combined reaper and mower..... S. S. Med.
W. A. Wood, Hoosic Falls, Manny's combined reaper and mower, with Wood's improvement,..... S. Med.
James Fowler, Fowlerville, Livingston county, 8 horse thrashing machine, horse power and separator.

This machine came too late for competition, and after awards were made.

W. L. VAN DENBURGH, *Chairman*

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SPECIAL COMMITTEE.

Finlay Frazer, Trenton, Oneida county, model barn floor to save liquid manure,.....S. Med.

Finlay Frazer, Trenton, Oneida county, liquid manure distributor,..... Dip.

DYNAMOMETER—Samuel Hurlbut.—A special committee was appointed to test any dynamometers entered. The committee was present until Friday morning, but did not find the dynamometer or exhibitor, and no trial was had. The committee on machinery supposing, it is presumed, that the dynamometer was overlooked, reported a Silver Medal; as the award for the best dynamometer was on the printed schedule—but the dynamometer was not entered on the list submitted to them. The Executive Committee withhold the award until a trial can be had, which will be given at any time when the instrument is presented for the purpose.

BYRAM'S PATENT POTATO DIGGER.—H. W. Pitkin, Manchester, Vt.—A strong, useful and durable implement—recommended for a Diploma.

BARTON'S REVERSIBLE PLOW.—This is a new plow, with a moveable beam, entirely different from any one that has been presented at our fairs. It has had thorough trial the past season, on the public works on Cayuga lake, under the charge of the Hon. George Geddes, and has given entire satisfaction, and has diminished largely the expense of plowing the hard substances to be removed. The beam is attached to the share by a strong point on the under side, and the point of the plow is attached to a strong coulter attached to the center of the beam, so that whichever way the beam is turned the point goes with it, and the beam is in the right position for work. It may be used as a double mold board plow, but its great value consists in being a right or left hand plow as needed.

CLASS V.—GRAIN, SEEDS, VEGETABLES, &c.

No. 53.—GRAIN AND SEEDS.

Wm. Ottley, Phelps, Ontario county, best sample white winter wheat,..... $5

E. S. Hayward, Rochester, 2d best do,..... 3

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Wm. Ottley, Phelps, Ontario county, best sample red winter wheat,..... $5
O. Howard, Auburn, 2d best do,..... 3
J. Chamberlain, Canton, St. Lawrence county, best sample red spring wheat,..... 5
O. Howard, Auburn, 2d best do,..... 3
Amos Goulding, Le Ray, Jefferson county, best sample rye,. 5
Wm. Ottley, Phelps, Ontario county, best sample oats,..... 5
Wm. Richey, Watertown, Jefferson county, 2d best do,..... 3
J. C. Wright, Denmark, Lewis county, best sample barley,. 5
Wm. Ottley, Phelps, Ontario county, 2d best do,..... 3
O. A. Graves, Watertown, Jefferson county, best sample Indian corn,..... 5
O. Howland, Auburn, 2d best do,..... 3
do do best sample buckwheat,..... 3
Henry Weir, Johnsonville, Rensselaer county, 2d best do,... 2
do do do best sample flax seed, 3
L. T. Marshall, Vernon, Oneida county, best sample hops,.. 3
J. H. Dunbar, Hamilton, Madison county, 2d best,..... 3
E. J. Hayward, Rochester, best sample timothy seed,..... 3
O. Howland, Auburn, 2d best do,..... 2
Wm. Ottley, Phelps, Ontario county, best sample clover seed, 3
C. A. Ostrander, Hounsfield, Jefferson county, best sample yellow seed corn,..... 3
P. Mattoon, Vienna, Oneida county, 2d best do,..... 2
C. D. Bent, Sterling, Cayuga county, best white seed corn,. 3
John Winslow, Watertown, Jefferson county, 2d best do,... 2
E. S. Hayward, Rochester, Monroe county, best sweet corn,. 3

Discretionary.

Robert McKeane, Governeur, St. Lawrence county, 12 ears white seed corn, "St. Regis,".....Trans.

No. 54.—VEGETABLES.

Henry N. Kimball, Rutland, Jefferson county, best white table turnips,..... $3
Edward Maynard, Brownville, Jefferson county, best carrots, 3
Hiram Converse, Pamelia, Jefferson county, 2d best,..... 2
George Parish, Ogdensburgh, St. Lawrence county, best beets, 3
H. Merrill, Watertown, Jefferson county, 2d best do,..... 2
Geo. F. Paddock, Watertown, Jefferson county, best parsneps, 3

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Abner Archer, Rutland, Jefferson county, best onions,..... $3
W. S. Pallet, Sacketts Harbor, Jefferson county, 2d best do, 2
L. D. Olney, Jefferson county, best cabbage,..... 3
Abner Ball, Jefferson county, 2d best do,..... 2
C. T. Smith Watertown, Jefferson county, best tomatoes,... 3
Geo. F. Paddock, Watertown, Jefferson county, 2d best do,. 2
do do do best purple egg-plant, 3
B. F. Bliss, Adams Center, best sweet potatoes,..... 3
G. Vroman, Lowville, Lewis county, 2d do,..... 2
James Halleck, Utica, Oneida county, best Lima beans,.... 3
Geo. F. Paddock, Watertown, Jefferson county, 2d best do,. 2
George Parish, Ogdensburgh, St. Lawrence county, best summer radishes,..... 3
E. S. Hayward, Rochester, 2d best do,..... 2
do do best winter radishes,..... 3
George Parish, Ogdensburgh, St. Lawrence county, best garden squashes,..... 3
A. P. Sigourney, Watertown, Jefferson county, 2d best do,.. 2
S. Cone, Gouverneur, St. Lawrence county, best large squashes, 3
James Halleck, Utica, 2d best do,..... 2
James S. Holbert, Chemung county, best field pumpkin,.... 3
D. Delano, Watertown, Jefferson county, 2d best do,..... 2
Truman Barrett, Adams Center, Jefferson county, best table potatoes,..... 3
Henry Bunce, Adams Center, Jefferson county, 2d best do,. 2

Discretionary.

Albert Massey, Watertown, Jefferson county, a pyramid of vegetables,.....S. Med.
K. Hursby, Sacketts Harbor, Jefferson county, a sample of wild Mexican potatoes,.....Trans.
C. G. Hager, 10 squashes, weighing 551 lbs., from one vine, Trans.
Morgan Bowhall, Watertown, Jefferson county, a specimen of potatoes raised from the seed, ...Trans.

No. 54. FLOUR, &c.

William H. Angel, Watertown, Jefferson county, best barrel flour,.....S. Medal.
C. M. Joslyn, Brooklyn, C. W., extra family flour, ...S. S. M.
Mrs. Stephen Gifford, Watertown, Jefferson county, best preserved fresh fruits,.....S. S. M.

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B. S. Carpenter, Elmira, Chemung county, sample dried apples,.....S. S. M.

B. P. Kimball, Watertown, pearl barley and split peas,..... Dip.

All of the flour exhibited was of good quality. The award was given to No. 183, exhibited by W. H. Angel, as having the appearance of most life and best bread-making qualities. Flour from Brooklyn, C. W., exhibited by G. M. Joslyn, is a very nice article indeed, and worthy of commendation. The flour exhibited by A. McNaughton, Newcastle district, Queen's brand, C. W., by Lepper, Haven & Co., of Watertown, and by Samuel Clark, of Watertown, were nice samples, but, in the opinion of the committee, ground a little too close. The bread exhibited was not deemed worthy of a premium.

H. THOMPSON, Toronto, C. W., *Chairman.*

No. 56. BUTTER.

B. S. Carpenter, Elmira, Chemung county, best lot of butter made from 5 cows in 30 consecutive days,..... $25

J. H. Zimmerman, Pamelia, Jefferson county, best 25 lbs. of butter made in June,..... 15

D. M. Todd, Rodman, Jefferson county, 2d best do,..... 10

B. S. Carpenter, Elmira, Chemung county, 3d best do,..... 5

Mrs. Ward Hubbard, Watertown, Jefferson county, 4th best do,.....Trans.

Henry M. Kimball, Rutland, Jefferson county, best 50 lbs. made at any time,..... 15

Elijah Kingsley, Harrisburgh, Lewis county, 2d do,..... 10

James S. Holbert, Chemung, Chemung county, 3d best do,.. 5

Milton G. Norton, Gouverneur, St. Lawrence county, 4th best do,.....Trans.

GIRLS UNDER 21 YEARS OF AGE.

Miss Amelia S. Waters, Watertown, Jefferson county, best lot of butter,.....Silver Cup.

Miss Emily Brown, Rutland, Jefferson county, 14 years old, 2d best do,.....Pair butter knives.

Miss E. W. Waters, Lowville, Lewis county, 3d best do, Set tea spoons.

Miss Julia Davidson, Elmira, Chemung county, 4th best do, S. S. M.

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The committee would respectfully report that they have performed their difficult and laborious task, and that they have carefully examined all the butter offered, which was some 70 packages, being many more than has been presented for many years, and perhaps the most ever presented at any fair since the formation of the society. The committee found great difficulty in deciding on the merits of the different packages, but have done so according to the best of their judgment. They regret that they were limited to so few premiums, as many of the samples were first rate; and only by a very close examination, after bringing all the packages to a certain standard and reducing the number to about 12 or 15 as extra No. 1, and then re-examining and finally awarding the premiums.

We would especially notice a jar of 10 lbs. of butter made by a Miss A. O. Bent, 10 years of age, of Sterling, Cayuga county, from the milk of a yearling heifer, commencing on the 2d day of Aug. and ending on the 5th day of September. The committee, after examining the butter and finding it of fair quality, think that she is deserving of great praise, and further to encourage others hereafter to habits of industry, feel at liberty to award her a silver cup, and by so doing hope to encourage her and others to try again, and take the Society's first premium.

M. M. SMITH, Lewis county,
H. P. BENTON, Boston, Mass.,
Committee.

No. 57. CHEESE.

S. M. Campfield, Champion, Jefferson county, best 100 lbs. one year old and over, ... $20
E. F. Carter, Le Ray, Jefferson county, 2d best do, ... 15
W. P. Babcock, Champion, Jefferson county, 4th best do, ... 5
Jeremiah Parker, Watertown, Jefferson county, 5th best do, Trans.
Nelson Fry, Gouverneur, St. Lawrence county, best 100 lbs. less than one year old, ... $20
P. H. Powers, Sandy Creek, Oswego county, 2d best do, ... 15
John Winslow, Watertown, Jefferson county, 3d best do, ... 10
E. F. Carter, Le Ray, Jefferson county, 4th best do, ... 5
George Parker, Watertown, Jefferson county, 5th best do, Trans.
Nelson Fry, St. Lawrence county, best cheese boxes, ... 2

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The exhibition of cheese was the largest and best ever seen, and does great credit to the exhibitors and the Society. The quality is most excellent, showing the high standard our dairymen have reached. The ten cheeses exhibited by Nelson Fry of Gouverneur, St. Lawrence county, were the most even quality, for such a quantity, (the cheese weighing from 120 to 180 lbs. each,) that has ever come under our notice. Mr. Fry's statement is recommended for publication.

No. 58. SUGAR AND HONEY.

S. B. & S. F. Woolworth, Copenhagen, Lewis county, best 25 lbs. Maple sugar, ... $5
Gilbert L. Read, Adams Center, Jefferson county, 2d best do, 3
A. J. & A. Dike, Depeyster, St. Lawrence county, 3d best do, Trans.
O. Bartholomew, Brownville, Jefferson county, best 20 lbs. honey, ... $5
H. N. Millard, Rural Hill, Jefferson county, 2d best do, ... 3
E. W. Phelps, Elizabeth, New-Jersey, 3d best do, ... Trans.
Gilbert L. Reed, Adams Center, Jefferson county, maple molasses, ... Trans.

S. B. CHAMPION, Del. county, *Chairman.*

CLASS VI.—DOMESTIC MANUFACTURES, &c.

No. 59.—WOOLEN GOODS No. 1.

Mrs. L. G. Snell, Denmark, Lewis county, best pair woolen blankets, ... $8
Mrs. S. E. Field, Hounsfield, Jefferson county, 2d best do, .. 6
Miss E. G. Lathy, Phelps, Ontario county, 3d do, ... 6
Mrs. Jeremiah Parker, Watertown, Jefferson county, 4th best do, ... Trans.
Mrs. O. Howland, Auburn, Cayuga county, best woolen cloth, 8
Mrs. Jeremiah Bacon, Le Ray, Jefferson county, 2d best do, . 6
Mrs. Cyrus W. Reed, Hounsfield, Jefferson county, 3d best do, 4
Mrs. O. Wallace, Canton, St. Lawrence county, 4th best do, . Trans.
Mrs. H. Wier, Johnsonville, Rensselaer county, best woolen flannel, ... 8
Mrs. Horace Kimball, Brownville, Jefferson county, 2d best do, 6
Mrs. James T. Van Namee, Pittstown, Rensselaer county, 3d best do, ... 4
Mrs. S. A. Bunce, Vernon, Oneida county, 4th best do ... Trans.

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Mrs. J. N. Mitchell, Sandy Creek, Oswego county, best woolen carpet, ... $8
Mrs. H. Wier, Johnsonville, Rensselaer county, 2d best do,. 6
Mrs. C. L. Comins, Watertown, Jefferson county, 3d best do, 4
Mrs. M. L. Hungerford, Watertown, Jefferson county, best domestic ingrain carpet, ... 8
Mrs. A. C. Hall, Adams, Jefferson county, 2d best do,..... 6
Mrs. J. A. Brown, Pamelia, Jefferson county, 3d best do, .. 4
Mrs. J. Blood, Watertown, best hearth rug, ... 4
Mrs. J. C. Wood, Copenhagen, Lewis county, 2d best do,... 3
Miss M. H. Smith, Gouverneur, St. Lawrence county, 3d best do,.....Trans.
Mrs. C. Hunt, Adams, Jefferson county, best rag carpet,.... 6
Mrs. H. Graves, Hounsfield, Jefferson county, 2d best do,.. 4
Mrs. Jerome Ives, Watertown, Jefferson county, 3d best do,. 2
Mrs. G. C. Parker, Vienna, Oneida county, 4th best do,...Trans.

Discretionary.

Mrs. Orrin Terry, Marshall, Oneida county, a pair of woolen horse blankets, which are the work of superior skill and excellent taste,.....S. Med.
Mrs. Rachel Taylor, 6 blankets which she manufactured, being 73 years of age, without glasses, spinning the wool, coloring the yarn, and weaving the cloth,.....S. Med.
Mrs. G. C. Parker, Vienna, Oneida county, pair kersey blankets,.....Trans.
Mrs. N. Staples, Watertown, Jefferson county, a piece of ingrain carpeting,.....Trans.
Mrs. J. Van Dusen, Buel, Montgomery county, superior stocking yarn,.....Trans.

No. 60.—DOMESTIC MANUFACTURES No. 2.

Mrs. John Greenwood, Auburn, best double carpet coverlid,. $6
Mrs. B. G. Bloss, Rome, Oneida county, 2d best do,..... 4
Mrs. Jeremiah Parker, Watertown, Jefferson county, 3d best do, 2
Miss P. E. Graves, Hounsfield, Jefferson county, 4th best do, Trans.
Mrs. Henry Wier, Johnsonville, Rensselaer county, best woolen kersey, 10 yards,..... 6
Mrs. Anson Hungerford, Watertown, Jefferson county, best pair woolen knit stockings,..... 2
Mrs. B. F. Hunt, Rodman, Jefferson county, 2d best do,.... 1

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Miss Reed, Hounsfield, Jefferson county, 6 years old, best pair of woolen socks, ... $2
Miss Nancy Bristol, Hounsfield, Jefferson county, 2d best do, 1
Mrs. C. Richardson, Orleans, Jefferson county, best pair woolen fringe mittens, ... 2
Mrs. G. C. Parker, Vienna, Oneida county, 2d best do, ... 1
Miss Emily J. Clark, Pittstown, Rensselaer county, best woolen stocking yarn, ... 2
Mrs. Wm. Ottley, Phelps, Ontario county, 2d best do, ... 1
Mrs. Royal Wilcox, Watertown, Jefferson county, best knit bed spread, ... 4
Mrs. Joseph Goodale, Watertown, Jefferson county, 2d best do, 2
Mrs. J. Stears, Jr., Watertown, Jefferson county, 3d best do, 1

At the request of the judges on needle work and domestic manufactures No. 63, and with the approbation of the Executive Committee, we have examined quite a number of beautiful knit and tufted bed spreads, which were not on our premium list, and awarded three premiums (as above) to those which in our judgment were the most deserving. JAMES A. BELL, *Chairman.*

No. 61.—DOMESTIC MANUFACTURES No. 3.

Mrs. Henry Wier, Johnsonville, Rensselaer county, best 10 yards linen, ... $8
Miss Jane Welling, Johnsonville, Rensselaer county, 2d best do, ... 6
Mrs. Gifford L. Reed, Adams Center, Jefferson county, best linen diaper, ... 8
Mrs. Asa Barney, Pamelia, Jefferson county, 2d best do, ... 6
Mrs. J. T. Van Namee, Pittstown, Rensselaer county, 3d best do, ... 4
Miss E. J. Clark, Pittstown, Rensselaer county, 4th best do, Trans.
Mrs. Henry Wier, Johnsonville, Rensselaer county, best tow cloth, ... 5
Mrs. J. T. Van Namee, Pittstown, Rensselaer county, 2d best do, ... 3
Mrs. B. S. Carpenter, Elmira, Chemung county, best pair cotton knit stockings, ... 2
Mrs. Henry Wier, Johnsonville, Rensselaer county, 2d best do, 1
Mrs. G. L. Reed, Adams Center, Jefferson county, best pair linen knit stockings, ... 2

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Mrs. B. F. Hunt, Rodman, Jefferson county, 2d best pair linen knit stockings, ... $1
Mrs. G. L. Reed, Adams Center, Jefferson county, best linen sewing thread, ... 2
Miss Lucy Kimball, Watertown, Jefferson county, 2d best do, 1
Mrs. Henry Wier, Johnsonville, Rensselaer county, best water rotted flax, ... S. Med.
Miss Mary E. Banister, Phelps, Ontario county, best linen for gentlemen, ... 5
Miss Mary Adams, Utica, 2d best do, ... 3

Discretionary.

The following articles, properly belonging to No. 63, were on the committee's books, and they recommend the following premiums:

Miss Amanda Treadway, Black River, Jefferson county, a knit tidy, ... Dip.
Miss V. Adams, Watertown, Jefferson county, a hearth rug, S. Med.
Mrs. Joseph Goodale, Watertown, Jefferson county, knit bed spread, ... $1
A silk embroidered dress and cape, by a girl 13 years old, in the family of Samuel Hurlbut, Ogdensburgh, ... S. S. M.
Miss E. P. Trowbridge, Camden, Oneida county, two netted shawls and knit tidy, ... Dip. & S. S. M.
Mrs. Thomas Butler, Brownville, Jefferson co., table linen, Trans
Mrs. H. Hayward, Lewiston, Niagara county, knit bed spread, ... Trans.
Mrs. G. Hardy, Watertown, Jefferson county, bed quilt, ... Dip.
Mrs. R. Rogers, Watertown, Jefferson county, bed quilt ..... Dip.
do do crib quilt, S. S. M.
Mrs. J. A. Brown, Pamelia, Jefferson county, 1 pair linen pillow cases, ... Trans.

No 62. MANUFACTURES OTHER THAN DOMESTIC.

Utica Woolen Mills, best display of broadcloth and cassimers, ... S. Med. & Dip.
F. W. Andrews, Brownville, Jefferson county, best display of cotton sheeting, ... Dip.
W. A. Loomis, Watertown, Jefferson county, best piece unbleached sheeting, ... Dip.
M. H. Lines, Utica, best pair horse blankets, ... Dip.

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Clark Wilson, Watertown, Jefferson county, pair woolen blankets, ... Dip.

No. 63. NEEDLE WORK.

Miss Emily Wells, Watertown, Jefferson county, best shawl embroidery, ... $3

Mrs. James McBride, Watertown, Jefferson county, best cape embroidery, ... 3

Miss I. B. Page, Antwerp, Jefferson county, 2d best do, ... 2

Miss Louisa M. Riggs, Turin, Lewis county, 3d best do, ... 1

Miss Mary L. Burdick, Brookfield, Madison county, best ladies' scarf embroidery, ... 3

Mrs. Seymour Bailey, Rome, Oneida county, best toilet cushion embroidery, ... 3

Miss P. E. Graves, Hounsfield, Jefferson county, best specimen of Turkish embroidery, ... 3

Miss White, Pamelia, Jefferson county, 2d best do, ... 2

Miss J. A. Beebe, Watertown, Jefferson county, 3d best do, .. 1

Mrs. W. Hubbard, Champion, Jefferson county, best French needle work collar and undersleeves, ... 3

Miss P. F. Hubbard, Champion, Jefferson county, 2d best do, 2

Mrs. O. V. Brainard, Watertown, Jefferson county, 3d do, 1

Mrs. A. C. Cady, Watertown, Jefferson county, best specimen of worsted embroidery, ... 3

Mrs. S. Bailey, Rome, Oneida county, 2d best do, ... 2

Miss S. P. Clark, Watertown, Jefferson county, 3d best do, .. 1

Mrs. F. Emerson, Watertown, Jefferson county, best chair, (cushion and back,) 3

Miss Caroline Patridge, Watertown, Jefferson county, 2d best do, ... 2

Mrs. L. G. Hoyt, Watertown, Jefferson county, 3d best do, .. 1

Miss J. Hill, Albany, Albany county, best ottoman cover, .. 3

Mrs. Doct. A. Trowbridge, Watertown, Jefferson county, 2d best do, ... 2

Mrs. O. Childs, Philadelphia, Jefferson county, 3d best do, .. 1

Mrs. Joseph Goodale, Watertown, Jefferson county, best specimen papier mache, ... 3

Mrs. Doct. A. Trowbridge, Watertown, Jefferson county, 2d best do, ... 2

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Mrs. T. A. Smith, Gouverneur, St. Lawrence county, 3d best do, ... $1
Mrs. H. K. Newcomb, Watertown, Jefferson county, best silk bonnets, domestic,..... 3
Mrs. M. A. Hughes, Watertown, Jefferson county, 2d best do, 2
Mrs. A. Welch, Watertown, Jefferson county, 3d best do,... 1
Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best ornamental shell work,..... 3
Mrs. W. W. Herrick, Watertown, Jefferson county, 2d best do, 2
Mrs. H. Hayward, Lewiston, Niagara county, best specimen wax flowers,..... 3
Mrs. S. L. Helmer, Ilion, Herkimer county, 2d best do,..... 2
Miss Reed, Hounsfield, Jefferson county, (6 years old,) 3d best do,..... 1
Mrs. W. W. Herrick, Watertown, Jefferson county, best specimen pencil drawings,..... 3
Mrs. W. Hubbard, Champion, Jefferson county, best specimen crayon painting,..... 3
Mrs. S. M. Robinson, Watertown, Jefferson county, best oil painting,..... 5
Mrs. J. K. Bates, Watertown, Jefferson county, 2d best do,.. 3
Mrs. Silas Davis, Oswego, 3d best do,..... 2
Mrs. A. Blackstone, Adams, Jefferson county, best oil painting, (landscape,) 5
Mrs. R. Rogers, Watertown, Jefferson county, best white quilt, ... 3
Mrs. J. T. Van Namee, Pittstown, Rensselaer county, 2d best do, ... 2
Mrs. Chester Phippin, Watertown, Jefferson county, 3d best do, ... 1
Mrs. G. Hardy, Watertown, Jefferson county, best transfered quilt,..... 3
Mrs. George Volance, Oswegatchie, 2d best do, ... 2
Mrs D. R. Talcott, Adams, Jefferson county, 3d best do,..... 1
Miss Gertrude Ely, Watertown, Jefferson county, best patched work calico quilt, by girls under 12 years,..... 3
Miss Reed, Hounsfield, Jefferson county, (6 years old,) 3d best do,..... 1
Mrs. Gilbert L. Reed, Adams Center, Jefferson county, for fancy basket,..... Dip.

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Miss Frances Hungerford, Watertown, Jefferson county, leather work,..... Dip.
Miss Nancy Bristol, Hounsfield, Jefferson county, worked spread,..... Dip
Mrs. Jeremiah Parker, Watertown, Jefferson county, quilt,.. Dip.
Mrs. Washington Tucker, Watertown, Jefferson county, leather work,..... Dip.
Mrs. V. D. Cleveland, Brownville, Jefferson county, needle work,..... Dip.
Miss O. C. Crandall, Watertown, Jefferson county, leather work..... Dip.
Miss Lamphear, Wilna, Jefferson county, bed spread,..... Dip.
Mrs. H. F. Humphrey, Brownville, Jefferson county, wax fruit,..... Dip.
J. L. & A. Randall, Albany, embroidered shoes,.....S. Med.
Miss Mary Massey, Watertown, Jefferson county, wax fruit, Dip.
Miss Mary Sawens, Watertown, Jefferson county, embr'd dress,.....Trans.
Mrs. Louis Kimball, Brownville, Jefferson county, embr'd skirt,..... Dip.
Miss Amelia L. Fonda, Rutland, Jefferson county, net curtains,..... Dip.
Miss Cornelia A. Fonda, Rutland, Jefferson county, net gloves,..... Dip.
Mrs. A. Wilson, Carthage, oriental painting,..... Dip.
Miss J. C. Hall, Adams, Jefferson county, needle work,..... Dip.
Mrs. J. Sterling, Jr., Sterlingville, Jefferson county, leather work,..... Dip.
Mrs. J. Stears, Jr., Watertown, Jefferson county, collar and sleeves,..... Dip.
Mrs. L. A. Pierce, Watertown, Jefferson county, bed quilt,.. Dip.
Miss E. P. Trowbridge, Camden, Oneida county, embroidery, Trans. & Dip.
Adam Henry, Tuscarora Indian, bead work,..... Dip.
Mrs. E. L. Angel, Watertown, Jefferson county, fancy chair, Dip.
Miss S. M. Sherman, Watertown, Jefferson county, embr'd suspenders,..... Dip.
Mrs. Doct. A. Trowbridge, Watertown, Jefferson county worsted work,..... Dip.

Digitized by Google

Mrs. Doct. S. Bailey, Watertown, Jefferson county, leather work, ... Dip.
Miss P. E. Graves, Hounsfield, Jefferson county, leather work, Dip.
Mrs. M. H. Stanley, Watertown, Jefferson county, chair, ... Dip.
Mrs. Wm. Wood, Watertown, Jefferson county, fancy work, S. S. M.
Miss J. A. Beebe, Watertown, Jefferson county, rug, ... Dip.
Miss Julia R. Goodenough, Watertown, Jefferson county, collars, ... Dip.
Mrs. Samuel Wilson, Watertown, Jefferson county, tidy, ... Dip.
Mrs. Israel Adams, Rodman, Jefferson county, lamp mat, .. Trans.
Mrs. William McGinnis, Jr., Pamelia, Jefferson county, bead work bag, ... Trans.
Mrs. Horace Kimball, Brownville, Jefferson county, embr'd skirt, ... Dip.
Mrs. C. C. Scovil, Watertown, Jefferson county, embroidered skirt, ... Downing's Fruit.
Mrs. S. S. De Long, Watertown, Jefferson county, quilt, ... Trans.
Mrs. James Eddy, Rutland, Jefferson county, embroidered shoes, ... Dip.
Miss Helen Mundy, Watertown, Jefferson county, chair, ... Dip.
Mrs. J. Wakefield, Watertown, Jefferson county, bed spread, Dip.
Miss E. B. Lathey, Phelps, Ontario county, rose blankets, Trans.
Mrs. H. Graves, Hounsfield, Jefferson county, lace veil, ... Dip.
Mrs. George Volance, Oswegatchie, St. Lawrence county, embroidery, ... Dip. & Trans.
Miss C. M. Lansing, Watertown, Jefferson county, chair, ... Dip.
Mrs. L. G. Adams, Oswegatchie, St. Lawrence county, basket and embroidery, ... Dip. & Trans.
Mrs. M. B. Flagg, Oswegatchie, St. Lawrence county, embroidery, ... Dip. & Trans.
Miss Mary E. Banister, Phelps, Ontario county, collar and cuffs, ... Dip.
Mrs. S. H. Oliver, Martinsburg, Lewis county, bed spread, Trans.
Miss Sarah S. Mansfield, Watertown, Jefferson county, ottoman cover, ... Trans.
Mrs. S. A. Beverstock, Oswegatchie, St. Lawrence county, embroidery, ... Dip. & Trans.
Miss M. H. Smith, Gouverneur, St. Lawrence county, blankets, ... Dip.

Digitized by Google

Mrs. John Adams, Oswegatchie, St. Lawrence county, embroidery, ... Dip. & Trans.
Mrs. A. Ely, Watertown, Jefferson county, embroidery,. S. S. M.
Miss M. Butterfield, Fulton, Oswego county, lamp mats,.... Dip.
Mrs. A. J. La Grange, Albany, embroidery, ... Dip. & Trans.
Mrs. Orrin Terry, Marshall, Oneida county, tidy, ... Dip.
Miss Mary Peggs, Rome, embroidery,..... Dip. & Trans.
Mrs. A. Mather, Watertown, Jefferson county, velvet cap, Dip. & Trans.
Mrs. Joseph Goodale, Watertown, Jefferson county, embroidered suspenders, ... Trans.
Miss Emily Wells, Watertown, Jefferson county, chair, ... Dip.
Mrs. D. W. Eames, Turin, Lewis county, bed spread, ... Dip.
Mrs. Hart Barney, Rutland, Jefferson county, white bed spread,..... Trans.
Mrs. Joel Matteson, Hounsfield, Jefferson county, bed spread,..... Trans.
Miss Mary Bush, Pamelia, Jefferson county, leather work,.. Dip.
Mrs. C. E. Fowler, Watertown, Jefferson county, lamp mat, Dip.
Mrs. J. Blood, Watertown, Jefferson county, hearth rug,...Trans.
Mrs. J. H. Armstrong, Watertown, Jefferson county, bed spread,..... Trans.
Miss M. Adams, Utica, embroidery,..... Dip. & Trans.
Mrs. C. A. Kibby, Champion, Jefferson county, stamped embroidery, ... Dip.
Mrs. L. L. Angel, Watertown, Jefferson county, chair,..... Dip.
Miss H. Goulding, Watertown, Jefferson county, embroidery, Dip.
Mrs. W. P. Spalding, Theresa, Jefferson county, infant's dress, Dip.
Mrs. C. C. Scovil, Watertown, Jefferson county, quilt, ... Dip.
James Hope, Kingston, C. W., a case of embroidered shoes, S. Med.

MRS. B. N. HUNTINGTON, *Chairman.*

CLASS VII.

No. 64. PAINTINGS, &c.

Hoffman, Knickerbocker & Co., Albany, best drawing of show grounds for Society,..... Dip.
C. Van Benthuysen, Albany, best specimen typography, hand-bill of State Fair, very superior work,.....Dip. & S. Medal.
Bryant & Stratton, Buffalo, ornamental penmanship,.....Trans.

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E. P. Redway, Adams, Jefferson county, monochromatic painting, ... Dip.
Jonah Woodruff, Watertown, Jefferson county, lot of oil paintings, ... S. Medal and Dip.
Wm. Cloher, New Hartford, Oneida county, specimens penmanship, ... Dip.
S. M. Robinson, Watertown, Jefferson county, do painting, Trans.
Miss E. Trowbridge, Watertown, Jefferson county, ornamental painting on glass, ... S. Medal.
Mrs. Doct. A. Trowbridge, Watertown, Jefferson county, Grecian painting, view of suspension bridge, ... Dip.
Hoffman, Knickerbocker & Co., Albany, specimen lithography, wood engravings, &c., ... S. Medal.
S. C. Hart & Co., Watertown, Jefferson county, daguerreotypes, ... S. Medal & Dip.
Emma E. Beales, Watertown, Jefferson county, 12 years of age, picture and drawing, ... S. S. Medal.
George S. Dodd, Watertown, Jefferson county, oil painting very good, ... Trans.
Mrs. A. A. Stephens, Watertown, Jefferson county, crayon drawing, ... Dip.
A. H. Emory, Troy, Rensselaer county, architectural and topographical drawings, ... Dip.
E. B. Wynn, Watertown, Jefferson county, 2 cases of gold and silver coins, ancient and modern, very valuable, ... Dip.
Dr. J. S. Dunlop, Watertown, Jefferson county, oil paintings, portrait daguerrean likeness, ... Hon. Mention.
N. Stone, Oswego, crayon drawing and oil paintings, ... Dip.
S. M. Robinson, Watertown, pencil drawing "Last Appeal," Trans.
G. S. Rugg, Watertown, oriental painting, ambrotypes and daguerreotypes, ... Hon. Mention.
Hoffman, Knickerbocker & Co., Albany, colored fruit and drawing of cattle, ... Hon. Mention & Dip.
S. D. Barr, Watertown, Jefferson county, monochromatic painting, ... Hon. Mention.
Baker & Godwin, New-York, typography of Seneca County Fair, ... Dip.

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R. E. Ellerbeck, Rochester, specimens of drawing and mapping,.....Trans.

No. 65. SILVERWARE AND CUTLERY.

Sigourney & Hitchcock, Watertown, Jefferson county, best silver plated embossed tea set, also silver plated California plate,.....S. Medal.

Olmsted & Jones, Syracuse, best case of saddlery hardware, silver plating, &c.,.....S. Medal.

H. K. Newcomb, Watertown, Jefferson county, best case jewelry, general assortment, best gold watch,.....S. Medal.

Dr. J. A. Cowles, Rome, set of gutta percha teeth,.....S. Medal.

No. 60. STOVES, (COOKING.)

Ten Eyck & Boardman, Watertown Jefferson county, best cooking stove for wood, "Stewarts,".....S. Medal.

H. Cooper & Co., Watertown, Jefferson county, 2d do, "Union stove,".....S. S. Medal.

J. S. & M. Peckham, Utica, best do for coal, "Artisan," S. Medal.

Francis Hudson, Chicago, Ill., 2d do, Van's patent,..S. S. Medal.

do do best cooking range for families, Van's patent,.....S. Medal.

A. P. Brayton, Watertown, Jefferson county, caloric air furnace, 1st prem.,.....S. Medal.

J. S. & M. Peckham, Utica, agricultural furnace,.....Dip.

do do portable furnaces, galvanized,..Dip.

Wm. E. Haynes, Geneva, cooking stove, Hayne's portable tin and sheet iron,.....Dip.

The committee award the premiums on the articles above mentioned, for their cheapness, durability, and economy of fuel.

G. L. MACK, *Chairman.*

No. 67. STOVES, (PARLOR.)

Henderson, Kennedy and Kneeland, Albany, best ornamental parlor stove, for coal or wood, "Melodion,".....S. Medal.

J. G. Harbottle, Watertown, 2d do, "Ladies' Toilet," S. S. Medal.

Backus & Smith, Stuyvesant, Columbia county, best hall stove, S. Medal.

E. Corning & Co., Albany, "Littlefield's patent" hall coal burner,.....S. S. Medal.

Henderson, Kennedy & Kneeland, Albany, best fire grates, S. Medal.

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No. 68. LEATHER, INDIA RUBBER GOODS, &c.

M. H. Lines, Utica, best specimens, trunks,..... Dip
Edward Carter, Troy, best india rubber goods,..... Dip.
James Hope, Kingston, U. C., best india rubber shoes,..... Dip.
Bates & Baker, Watertown, best Spanish sole leather,..... Dip.
P. & P. Costello, Camden, Oneida co., best slpughter leather, Dia.
S. Pool, Watertown, Jefferson county, best oak calf skins,.. Dip.
do do do best upper leather,.. Dip.
B. F. Hotchkin & Co., Watertown, Jefferson county, for imitation oak calf skins,..... S. Medal.
W. H. Cross, Rochester, leather belting and fire buckets,.... Dip.
O. B. Matteson & Co., Morris, Otsego county, lace or string leather,..... Dip.
J. L. & A. Randall, Albany, patent leather boots and shoes, Dip.
do do ladies' heel gaiters,.....S. Medal.
do do do slippers,.....S. S. Medal.
James Hope, Kingston, U. C., calf and kip boots and shoes,. Dip.
do do satin heel gaiter,.....S. S. Medal.
Thomas Thompson, Kingston, U. C. superior Scotch boots and brogans,..... Trans.

No. 69. CABINET WARE

C. & D. Smith, Watertown, Jefferson co., best rosewood chair, Dip.
A. T. Brown, Albany, fancy tool chest, ...S. Medal.

There were other articles on exhibition, but only of ordinary workmanship, and not entitled to premiums.

No. 70. CARRIAGES.

Harlow Scovil, Watertown, best double carriage,..... Dip.
Colwell & Blish, Watertown, best single top buggy,..... Dip.
Guardenier & Selkirk, Albany, best double sleigh, ... Dip.
Harlow Scovil, Watertown, best slide seat carriage,..... Dip.
C. J. Boynton, New-York, best patent carriage,.....S. S. Medal.
Wm. S. Chapman, Cincinnati, Ohio, anti-ratling shaft-fastener, S. Medal.

No. 72. DISCRETIONARY.

Mrs. J. T. Van Namee, Pittstown, Rensselaer county, 2 fancy show cases,..... Dip.
C. Van Benthuysen, Albany, printing press, ... Dip.
J. J. Butler, agent, Cincinnati, O., Butler's book-keepers' writing fluid,..... Dip.

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Dr. W. R. Trowbridge, Watertown, Jefferson county, stuffed birds,.....S. Medal.
Dr. P. O. Williams, Watertown, Jefferson county, do, S. S. Medal.
do do do case minerals, 300 specimens, ... Dip.
J. F. Downing, A. Savage, agent, Felt's Mills, Jefferson co., self-adjusting pat. gate, ... Dip.
Dr. A. Trowbridge, Watertown, Jefferson county, anatomical preparation,..... S. Medal.
Butler & Parr, 554 5th street, Cincinnati, O., mercantile writing fluid,.....Dip. and S. Medal.
S. M. Bassett, Syracuse, specimens penmanship, ...S. S. Medal.
H. B. Duane, Malone, Franklin county, sample of iron paint, Dip.
H. Hecox, South Rutland, Jefferson county, cast iron sap spiles,.....Downing.
F. Starr, Rochester, semi-grand piano forte,.....S. Medal.
do do square do ..... Dip.
Marshall, James & Traver, Albany, 7 octave rosewood, do,.. Dip.
J. A. Smith, Watertown, Jefferson county, Hall & Sons oak carved piano,..... Dip.
Stephen Keys, Watertown, Jefferson county, window springs, Dip.
Hoffman, Knickerbocker & Co., Albany, Lithographic printing press, in operation,.....S. S. Medal.
Wm. Hall & Son, New-York, musical instruments, ...S. Medal.
A. B. Carter, Champion, jar pickles,.....P. O. Report.
O. P. Button, Watertown, case sea shells, ... Thomas.
G. R. Comstock, Little Falls, Herkimer county, improved American propeller,.....Trans.
American Printing Press Manufacturing company, Syracuse, patent printing press,..... Dip.
O. K. Rice, Greenwich, Washington county, a machine for shaving, coring and slicing apples,..... S. S. Medal.
O. K. Rice, Washington county, whiffletree iron, Hardman & Vorce's patent,.....Trans. Am. Inst.
Elihu Smith, Albany, American polishing grit, from Albany county,..... Barry.
D. W. Seeley, Albany, fire-escape ladder, "Roscoe's patent," Patent O. Report.

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R. E. Murray & Son, Watertown, agents, Wells & Provost, for Spratt's patent self-sealing cans,..... Dip.
R. M. Abbee, Thompsonsville, Conn., patent pig pen,..... Dip.
Tivoli Hose Company, Albany, hose carriage,..Dip. and S. Medal.
E. P. Minier, Cincinnati, O., Mathematical scale for cutting ladies' dresses,..... Dip.
Cowing & Co., Seneca Falls, fire engine,..... S. Medal.
C. S. Nicholson, Buffalo, door plate and bell,..... Dip.
George H. Barnard, Watertown, Jefferson co., fire engine, S. Medal.
C. M. Mead, Oswego, Professor Morris' premium baking powder,..... Trans.
Edward Carter, Troy, joiner's tools, ... Dip.
do do gyrascope,.....Trans. Am. Inst.
Mrs. H. Hayward, Lewistown, Niagara county, case of hair flowers,.....S. S. Medal.
Moses W. Pruyn, Fulton, Oswego county, leather creasing machine,..... Dip.
G. D. Mellotte, Watertown, boot trees and lasts,..... Dip.
J. H. Getman, Columbia, Herkimer county, patent mop,..Barry.
Mrs. A. N. Cooper, Oswego, specimen brand letter cutting on copper,..... Dip.
John B. Owens, Utica, American marble mantle piece, S. S. Med.
C. J. Mills, Gloversville, Fulton county, gloves and mittens, 1st premium,..... Dip.
Sterling & Riddell, Watertown, Jefferson county, blank books, Dip.
Charles Kathern, agent Union Glass Co., Cleveland, Oswego county, samples window, cylinder, and shade glass,..... Dip.
H. F. Ferrin, Watertown, Jefferson county, Italian monument, examined by committee, though not on fair grounds,.... Favorable Men.
H. Cooper & Co., Watertown, Jefferson county, crowbars, picks, roller ends, and tree trimmer,.....Vol. Trans.
S. S. Mills, Gloversville, Fulton county, buckskin mittens, S. Med.
Elsbury & Kelly, Skaneateles, Onondaga county, horse shoes, Dip.
Bloss & Darling, Rome, saleratus,..... Dip.
C. B. Morgan, Syracuse, door and gate springs,..... Dip.
Miss Fidelia Morgan, (a mute,) Syracuse, artificial hair and hair jewelry,.....S. Medal.
James D. Wilson, Adams Center, pair elk horns,.....Trans.

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S. M. Robinson, Watertown, currant wine,.....Thomas.
H. A. Mowry, do horse shoes,.....Dip.
R. Peck, Cortlandville, Cortland county, self-acting barn door fastener,.....Dip.
Luman Arms, Adams Center, 3 kinds wine,.....Thomas.
E. W. Phelps, Elizabeth, New Jersey, combination hive and bees,.....Dip.
H. & J. Dickerson, Gloversville, Fulton county, machine for cutting gloves and mittens,.....Dip.
J. A. Smith, Watertown, Chickering's carved parlor piano,..Dip.
S. B. Kinney, Scott, Cortland county, Davies' patent blind hinge,.....Dip.
S. Walrath, Canton, St. Lawrence county, thistle puller,..S. Med.
Miss Louis Fitch, Troy, Rensselaer county, case hair jewelry, Dip.
James Pearson, Antwerp, Jefferson county, iron drilling machine,.....Dip.
Israel Ward, Morristown, St. Lawrence county, axe helves, Trans.
Seymour, Brothers & Co., "Hecla Works," Oneida county, window blind butts, and fastenings,.....Dip.
H. F. Ferrin, Watertown, Jefferson county, set grave stones, Dip.
W. W. Herrick, do do do chair over 200 years old,.....Dip.
C. F. Smith, Watertown, Jefferson county, 2 deer, one male and one female,.....Trans.
Moses Eames, Rutland, Jefferson county, 2 bottles Metheglin, 40 years old,.....Norton's Prize Essay.
D. W. Perkins, Rome, Oneida county, dental chair,....S. Medal.
T. T. Dorcy, Watertown, 4 wheeled hose carriage,....S. Medal.
V. S. Hubbard, do Isabella grape wine, Norton's Prize Essay.
D. Minthorn, do ladies' corset shoulder brace,.....Dip.
Janes, Beebe & Co., New-York, beautiful iron fountains,.S. Med.
Mrs. T. A. Smith, Syracuse, papier mache and leather work stand,.....Dip.
H. N. Millard, Rural Hill, Osage orange plants,.....Trans.
D. Mann, 52 John street, New-York, American lactive or solidified milk, sample made in June last, and was used at refreshment room and pronounced equal to new milk,.S. Med.
James Durno, Albany, Durno's catarrh snuff,.....Dip.
C. D. Woodruff, Toledo, Ohio, impending eave troughs,....Dip.

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A. C. McFarland, Albany, superior chewing gum,..... Dip.
A. Stone & Co., Philadelphia, preserving fruit jars,..Vol. Trans.

LORENZO ROUSE, Paris, Oneida Co., *Chairman.*

CLASS VII.—FLOWERS, PLANTS, DESIGNS AND FRUITS.

No. 73.—PROFESSIONAL LIST.

Cut Flowers.

Thorp, Smith, Hanchett & Co., Syracuse, for the best display, S. Cup, val. $10

Dahlias.

John Wilson, Albany, best collection,..... 6
Ellwanger & Barry, Rochester, 2d do,..... 3
Thorp, Smith, Hanchett & Co., Syracuse, best 24 dissimilar blooms,..... 5
John Wilson, Albany, best 12 do,..... 3
Thorp, Smith, Hanchett & Co., Syracuse, 2d best do,..... 2
Wm. A. Burgess, Glen Wood, L. I., best American seedling,.S. M.

Roses.

Ellwanger & Barry, Rochester, greatest number of newest and best varieties,..... $8
Thorp, Smith, Hanchett & Co., Syracuse, 2d do,..... 3
do do do the newest and best 24 distinct varieties,..... 5
Thorp, Smith, Hanchett & Co., Syracuse, the newest and best 12 distinct varieties,..... 3

Phloxes.

Ellwanger & Barry, Rochester, the greatest number, newest and best varieties,..... $5
Thorp, Smith, Hanchett & Co., Syracuse, 2d best do,..... 2
do do do best 12 varieties,.. 3

Verbenas.

Thorp, Smith, Hanchett & Co., Syracuse, greatest number of newest and best varieties,..... $5
Thorp, Smith, Hanchett & Co., Syracuse, newest and best 12 varieties, ... 3
Thorp, Smith, Hanchett & Co., Syracuse, best American seedling,.....S. M.

German Asters.

John Wilson, Albany, best collection .....S. M.

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Pansies.

John Wilson, Albany, best collection,..... $3
Thorp, Smith, Hanchett & Co., Syracuse, 2d do,..... 2

No. 74. CUT FLOWERS.

Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best display,.....S. M.
Mrs. W. W. Herrick, Watertown, Jefferson county, 2d best do, ... $2

Dahlias.

Mrs. J. T. Van Namee, Pittstown, Rensselaer county, greatest number of newest and best varieties,..... 5
Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best 12 dissimilar blooms,..... 3
Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best 6 do,..... 2

Roses.

Mrs. Chatfield, Albany, best 6 varieties,..... 2

Verbenas.

Mrs. J. T. Van Namee, Pittstown, Rensselaer county, greatest number, newest and best varieties,..... 5
Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best 12 distinct varieties,..... 3
Mrs. Chatfield, Albany, 2d best do,..... 2
Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best 6 varieties,..... 2
Mrs. Chatfield, Albany, 2d best do,..... 1

Phloxes.

Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best seedling,..... 1

German Asters.

Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best collection,..... 3
Mrs. W. W. Herrick, Watertown, 2d do,..... 2

Pansies.

Mrs. Chatfield, Albany, best collection,..... 3
Mrs. W. W. Herrick, Watertown, 2d do,..... 2

Ten Week Stock.

Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best display,..... 3

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No. 75. GENERAL LIST.

Pot Plants

Mrs. J. T. Van Namee, Pittstown, Rensselaer county, best collection house plants, 20 different specimens, Cup, value $10

Floral design or Ornament.

Mr. J. C. Sterling, Watertown, best, ... 5
Mrs. O. V. Brainard, Watertown, 2d do, ... 3

Bouquets.

John Wilson, Albany, best pair hand, ... 5
Ellwanger & Barry, Rochester, 2d do, ... 3
Mrs. J. T. Van Namee, Pittstown, Rens., co., best do, parlor, 9
John Wilson, Albany, 2d best do, ... 4

No. 76. PROFESSIONAL LIST.

Apples.

Ellwanger & Barry, Rochester, best 20 varieties, Plate, value $10

Pears.

Ellwanger & Barry, Rochester, greatest number of good varieties, 150 varieties, ... S. Cup, value 15
H. E. Hooker & Co., Rochester, 2d do, 50 varieties, S. Cup, val. 10
Ellwanger & Barry, Rochester, best 20 varieties, S. Plate, value 10
do do best 12 do do 8
do do best 6 do do 5

Peaches.

J. S. Odell, Fair Haven, Wayne county, best 6 varieties, ... 4
do do do best 1 variety, 12 specimens, ... 2
John C. Hastings, Clinton, Oneida county, metalic label for trees, ... Dip.

The first article on the list of the committee on professional competition for premiums on apples, pears and peaches, although not enumerated in the printed list subject to their award, was perhaps properly entered on their book, as being a matter of more interest to nurserymen, orchadists, and those more or less engaged in the cultivation and sale of fruit trees. We refer to the metalic labels for trees. Both the materials of which they are composed—iron and tin—and the mode and material for securing an indelible inscription, will commend the invention to the notice of the classes above mentioned, as supplying a cheap and durable label for designating the name of the plant and the date and

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character of the weather when sown or planted. To encourage the manufacture of the "metalic label," your committee recommend that the Diploma of the Society be awarded to the inventor, J. C. Hastings, Clinton, Oneida.

Several causes, needless to specify, contributed to limit the competition in apples and peaches; but your committee are decidedly of the opinion that had exhibitors been much more numerous, better specimens of several choice varieties of the peach, viz: the Morris White, Crawford Late, Malacatoon, and a very large, splendid and delicious new variety, designated by the not very euphonious title, "Stumps the World," could hardly have been better, nor could the premiums have been better deserved.

This collection of seven varieties of the peach was grown by Mr. Odell, in the extreme northern part of Wayne county, N. Y., upon or near the shore of Lake Ontario.

But one competitor entered the lists for the premium offered for apples. This collection of twenty varieties, exhibited by Messrs. Ellwanger & Barry, of Rochester, was composed of fair specimens, well arranged and correctly named, so far as your committee were able to determine.

But it is in *pears* that the present exhibition, in perfection of arrangement and specimens and number of good varieties, amounting in one case to one hundred and fifty varieties, and in another to fifty-nine varieties, is believed to have excelled any ever before witnessed at an annual fair of your Society, affording an opportunity to those whose desire to make a selection of choice varieties, for amateur cultivation, which seldom occurs. The first premium for pears was awarded to Ellwanger & Barry, Rochester, not only because the collection was most numerous, but because the specimens exhibited were actually more meritorious, better arranged and labeled, and the rules of the Society more nearly complied with.

As regards the correct naming of 150 varieties of pears, your committee would not assume to be able to decide, and the more especially under the present circumstances, when neither time nor convenience offers an opportunity to consult authorities on the subject; but so far as the knowledge or experience of either of the judges extended, the varieties were correctly named.

W. D. COOK, *Chairman.*

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No. 77. PROFESSIONAL LIST.

Plums.

Ellwanger & Barry, Rochester, greatest number varieties, Plate v. $5

Grapes.

Ellwanger & Barry, Rochester, greatest number varieties, and best specimens foreign grapes grown under glass, Plate v. $10

John Wilson, Albany, best 1 variety, "Rebecca," 3

do do 2d best, do 3

The committee award the first premium for the best specimen of native grave to the "Rebecca," a native white grape, said to be perfectly hardy at Hudson and other places on that river, without laying down in the winter; it is good flavor, not foxy, and should it prove a hardy and good bearer, will be a valuable addition to our native collection.

E. WARE SYLVESTER, *Chairman.*

No. 78. AMATEUR LIST.

Apples.

C. B. Burtiss, Phelps, Ontario county, greatest number good varieties, ... S. cup, v. $15

C. B. Burtiss, Phelps, Ontario county, 2d do, ... 10

E. S. & E. N. Hayward, Rochester, best 20 varieties, Plate v. 10

J. M. Wilcox, Three mile bay, Jefferson county, 2d best do, 5

Nathan Talcott, Adams, Jefferson county, best 12 varieties, 5

Willard Ives, Watertown, Jefferson county, 2d best do, ... 3

Pears.

Elisha Dorr, Albany, best 6 varieties, ... Plate v. $5

Peaches.

H. G. Dickinson, Lyons, Wayne county, greatest number varieties, ... Plate v. $5

James Pierce, Oswego, 2d greatest No. do, ... 3

H. G. Dickinson, Lyons, Wayne county, best 1 variety, ... 2

The committee found a collection of fine apples, said to be 33 varieties, but as they were not named they were excluded from competition.

They also found several small collections and dishes of single varieties, which they can only bestow their commendation upon.

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Several fine dishes of Virgalieu pears were shown, but no premiums were offered for less than 6 varieties. Dishes of the Virgalieu, exhibited by H. G. Dickinson and James Pierce, were fine.

SAMUEL DICKSON, M. D., *Chairman.*

No. 79. AMATEUR LIST.

Plums.

Elisha Dorr, Albany, greatest number of varieties and best, Plate value $5

Elisha Dorr, Albany, best 6 Howard's Favorite, Schuyler's Gage, Green Gage, Imperial Gage, Bleecker's Gage, and Coe's Golden Drop, ... 3

Elisha Dorr, Albany, best 1 Coe's Golden Drop, ... 2

Quinces.

P. H. Hastings, Irondequoit, Monroe county, best, (Orange variety,) 3

H. G. Dickinson, Lyons, Wayne county, 2d do, ... 2

Grapes.

Elisha Dorr, Albany, best and greatest number native varieties, (for Winne, Isabella, Delaware, and Catawba grapes,) Plate value 5

E. S. & E. N. Hayward, Rochester, 2d best do, ... 3

James Smith, Rodman, best 1 variety, "Isabella," 2

Jason Clark, Plessis, Chasselas grape grown in open air, best 1 variety, foreign grapes, ... 3

Watermelons.

H. H. Harrington, best specimen, ... 2

Discretionary.

Dr. J. Binsse, Watertown, for well grown and ripened specimens of the Isabella and Golden Chasselas, ... Downing.

James Pierce, Oswego, 5 varieties of grapes, ... Thomas.

J. M. Bosworth, North Adams, Jefferson county, 2 varieties good grapes, ... Downing.

T. E. Beecher, Watertown, native grape, (chicken grape,) Barry.

The plums exhibited by Elisha Dorr, of Albany, numerous in variety and fine in quality. No nectarines exhibited, and it is recommended that the premiums be discontinued, as but few are ever exhibited, and its cultivation very limited. Show of quinces was not large, but specimens good. Melons—Show limited.

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Grapes—The show was fair, particularly of native varieties, and the success of vine-growers in Northern New-York sufficiently encouraging to invite and stimulate to further effort.

The Delaware grape, of Ohio, is recommended for general cultivation.

S. MILLER, Rochester, *Chairman.*

No. 80. FOREIGN FRUIT.

Pears.

C. M. Hovey, Boston, Mass., greatest number of varieties, (200 varieties,)..... Silver Cup, value $15
C. M. Hovey, Boston, Mass., best 20 varieties, do 10

P. BARRY, Rochester, *Chairman.*

PREMIUMS AWARDED, FEBRUARY, 1857.

FARMS.

Solomon Walrath, Rensselaer Falls, St. Lawrence county, plate, value,..... $30

GRASSES, &C.—FOR MUSEUM.

Wm. M. Beauchamp, Skaneateles, 154 plants, arranged for Museum, plate,..... 15
C. Thurston Chase, Chatham, Columbia county, Autumn leaves, plate,..... 10

SEEDS AND GRAIN—ARRANGED FOR MUSEUM.

Wm. P. Ottley, Phelps, Ontario county,..... 15
Volney Burgess, Chatham, Columbia county,..... 10

BUTTER.

B. S. Carpenter, Elmira, Chemung county, 3 tubs fall butter, 15
R. T. Carpenter, Southport, Chemung county, 3 tubs fall butter,..... 10
Mrs. Elizabeth Lathey, Phelps,..... 10
S. S. French, Herkimer county,..... 4

WINTER BUTTER.

Mrs. Emily Newcomb, Johnsonville, Rensselaer county, one crock butter,..... 5
R. S. Carpenter, Elmira, 1 tub butter,..... 3
R. T. Carpenter, Southport, 1 tub butter,..... S. S. Medal.

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S. S. French, Herkimer county,..... $3
Mrs. Wm. Ottley, Phelps,..... 2

CHEESE.

E. F. Carter, Le Ray, Jefferson county, 3 cheese,..... 15
Moses Eames, Rutland, do do 3 do 10
C. W. Eells, Westmoreland, Oneida, 3 cheese,..... 5
R. Harvey, Lewis county, exhibited two very fine cheese, and a special premium is recommended.
Mrs. Elizabeth Lathey, Phelps,..... 10
Mrs. Wm. Ottley, Phelps,..... 5

CROPS.

WINTER WHEAT.

E. S. Hayward, Brighton, Monroe, 2 acres 20 rods, 74½ bushels—special premium,..... $15

RYE.

Amos Goulding, Le Ray, Jefferson county, 3. 95-100 acres, 142 bushels,..... 15

BARLEY.

John C. Wright, Copenhagen, Lewis, 3. 82-100 acres, 2 rowed, 198. 38-100,..... 15
W. P. Ottley, Phelps, Ontario, 2 acres, 6 rowed, 99 bushels, 10

BUCKWHEAT.

G. C. Pool, Clinton, Oneida, 1. 41-100 acres, 49 bushels—41 bushels, 7 lbs. per acre,..... 8

BEANS.

Simeon H. Williams, N. Hartford, Oneida, 1 acre, 29 bushels, 8

PEAS.

Ira R. Peck, East Bloomfield, Ontario, 1 acre, 31. 36-100 bushels,..... 8

POTATOES.

Peter Crispell, jr., Hurley, Ulster county, 1. 1-10 acres, 480 bushels—yam potatoes,..... 8
Rev. C. E. Goodrich, Utica, for a fine exhibition of his seedling potatoes, of great value,..... 20

CLOVER SEED.

Ira R. Peck, East Bloomfield, 4. 15-100 acres, 16. 28-60 bush. 5

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TIMOTHY SEED.

E. S. Hayward, Brighton, Monroe, 1 acre, 9¼ bushels,..... $5

CARROTS.

John Brodie, Rural Hill, Jefferson county, 1 acre, 1,610 bush., 8

Elam C. Bliss, Westfield, Chautauque county, ½ acre, 300 bushels,..... 5

GRAIN AND SEEDS.

WHEAT.

Charles W. Eells, Clinton, Oneida, 1 barrel tea wheat,..... $5

David Coonradt, Brunswick, Rensselaer, 1 bbl. winter wheat, 3

Van Vleck Nottingham, Onondaga, one barrel,.....Trans.

E. S. Hayward, Brighton, Monroe, Soule's wheat. This was delayed on railroad, but was of extraordinary excellence, and a premium was awarded,..... 5

W. P. Ottley, Phelps, (same delay), white and red winter wheat $5, $3, 8

RYE.

David Coonradt, Brunswick, Rensselaer county,..... 5

Henry Schoonmaker, Bethlehem, Albany,..... 3

Henry Wier, Johnsonville, Rensselaer,..... 2

BARLEY.

Amos Goulding, Le Ray, Jefferson, 2 rowed,..... 5

Norman Gowdy, Lowville, Lewis,..... 5

Wm. P. Ottley, Phelps, 2 and 6 rowed,.....$5, $3, 8

OATS.

David Coonradt, Brunswick,..... 5

Peter Crispell, jr., Hurley,..... 2

Van Vleck Nottingham, Onondaga,.....Trans.

W. P. Ottley, Phelps,..... 5

WHITE CORN.

W. P. Ottley, Phelps,..... 5

David Coonradt, Brunswick,..... 3

YELLOW CORN.

David Coonradt, Brunswick,..... 5

Charles W. Eells, Clinton,..... 3

Henry Wier, Johnsonville,..... 2

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E. S. Hayward, Brighton, detained on railroad, but being very superior—premium,..... $5
W. P. Ottley, Phelps,..... 3

PEAS.

Norman Gowdy, Lowville,..... 5
Wm. P. Ottley, Phelps,..... 5
S. S. French, Herkimer county,..... 5

BEANS.

David Coonradt, Brunswick,..... 5
Henry Wier, Johnsonville,..... 3

CLOVER.

Wm. P. Ottley, Phelps,..... 3

TIMOTHY SEED.

E. S. Hayward, Brighton,..... 5

BUCKWHEAT.

Henry Schoonmaker, Bethlehem,..... 3

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NEW-YORK STATE AGRICULTURAL SOCIETY.

B. B. KIRTLAND—Treasurer's Account.

RECEIPTS.

February, 1856.

To balance in treasury,		$2,743 69
Members annual meeting,		323 00
Premium returned (Ottley,)		4 00
Cash from State,		700 00
Receipts at Fair,		8,010 00
Rent of grounds,		200 00
Horace Greeley, for premiums offered,		100 00
Watertown committee, part pay expenses,		500 00
Note discounted,	$2,000 00	
discount,	46 00	
		1,953 97
Note discounted,	$1,000 00	
discount,	12 08	
		987 92
Note discounted,	$2,500 00	
discount,	44 59	
		2,455 41
		$17,977 99

EXPENDITURES.

February, 1856.

Expenses winter meeting,	$80 51
Premiums, Fair Elmira,	216 38
do Winter meeting,	677 50
Library books and binding,	163 94
Postage account,	194 75
Dr. Fitch, Entomologist,	1,050 00
Incidental expenses Society,	990 33

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Printing and advertising,	$194 07
Salaries, assistant, &c.,	2,202 70
Superintendent's and gate keepers', fair,	582 25
Miscellaneous expenses, do,	1,213 27
Clerks and assistants at fair,	505 50
Premiums, Fair Watertown,	4,366 09
Paid for completing agricultural rooms,	3,495 77
Cash paid notes bank,	3,000 00
	$18,933 06
Treasurer in advance,	$955 07
The am't advanced for completing building, and salary of Entomologist, &c.,	$4,595 77
Which is provided for in bill before the Legislature, and will leave a balance in the treasury of	$1,140 70

We certify that we have carefully examined and compared the preceding account with the vouchers accompanying the same, and that the same is in all respects just and true.

T. S. FAXTON, *President.*
B. P. JOHNSON, *Secretary.*

February 10, 1857.

Expenses winter meeting, voucher,	1 to 13,		$80 51
Library books and binding, "	1 to 7,		216 38
Postage account, "	1 to 9,		163 94
Dr. Fitch, Entomologist, "	1 to 4,		1,050 00
Incidental expenses, "	1 to 26,		990 33
Printing and advertising, "	1 to 11,		194 07
Salaries—Trav'g expenses, &c. "	1 to 30,		2,202 70
Superint's and gate keepers, "	1 to 14,		582 25
do do "	1 to 18,		
Miscellaneous expenses fair, "	1 to 8,		1,213 27
Clerks and assistants, "	1 to 22,		505 50
Paid for completing Ag. rooms, "	1 to 8,		3,495 77
Money paid on notes dis'd, "	1 to 2,		3,000 00

PREMIUMS—ELMIRA.

E. S. Hayward,	$7 00
R. Gypson, sheep,	5 00

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L. L. Norton, horse,	$10 00
E. S. Hayward,	12 00
A. Saul & Co., fruit,	10 00
B. P. Johnson, premium expenses,	1 38
Anne Wynkoop, domestic manufacture,	4 00
John E. Gavit, diplomas,	78 00
J. C. Burdett, implements,	5 00
J. S. Holbert, stock, &c.,	28 00
M. C. Baldwin, vegetables,	3 00
James Merriman, bull,	5 00
Robert Lovett, medals,	48 00
	$216 38
Expenses winter meeting, vouchers 1 to 13,	$80 51

PREMIUMS—WINTER MEETING, 1856.

No. 35.	Frank Atwater,	$4 00
30.	Geo. J. J. Barber,	25 00
	Noble Hill, cranberries,	5 00
13.	William M. Holmes,	32 00
12.	T. C. Maxwell & Bros.,	20 00
	W. C. Watson,	100 00
11.	David Hess, grain,	10 00
10.	L. D. Clift, farm,	20 00
9.	Clinton T. Ringe, cheese,	5 00
8.	Noah Hitchcock, Jr., butter,	5 00
7.	John Gilbert, cheese,	15 00
6.	J. W. Briggs, oats,	3 00
5.	H. H. Doolittle, beans,	3 00
4.	David Coonradt, fruit,	3 00
3.	E. F. Carter, cheese,	10 00
1.	Norman Gowdy, peas,	8 00
32.	Thomas Richardson, cattle,	35 00
31.	Stephen T. Owen, apples,	5 00
14.	Asa Otis,	5 00
15.	M. Johnson,	10 00
18.	David Coonradt,	23 00
16.	John Westfall, farm,	30 00
17.	Elisha M. Bradley, oats,	15 00

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17. Volney Burgess,	$13 00
21. R. A. Downs, apples,	1 00
20. A. E. Van Allen	5 00
22. Jas. P. Noxon, flax seed,	3 00
24. Norman Gowdy, peas,	3 00
23. O. Howland, barley, wheat and beans,	14 00
25. John V. Grove, farm,	50 00
26. J. S. Holbert, butter,	10 00
27. R. F. Carpenter, do,	15 00
28. E. C. Bliss, irrigation and field crops,	41 00
35. Israel O. Scudder, celery,	3 00
2. Sanford Howard, essay,	40 00
21. Essay on meteorology,	75 00
33. George Waterman, eng. spoons, &c.,	3 00
38. do do	6 50
34. Mrs. C. Tabour, kersey,	4 00
	$677 50

PREMIUMS.—FAIR AT WATERTOWN.

A.—Miss Mary Adams, linen,	$3 00
Peter Archdeakon, stallion,	15 00
S. Adsit, mare and colt,	15 00
A. Archer, onions,	3 00
American Mill Company, corn and cob crusher,	3 00
D. Avery, mare, (1855),	8 00
B.—Henry S. Bowtell, riding horse,	8 00
C. Baker, cow,	25 00
Miss Mary Banister, needle work,	5 00
Henry Battell, foreign horse,	15 00
O. H. Brainard, flowers,	4 00
J. Blood, rug,	4 00
Harvey Beals, horses,	20 00
M. Baily, needle work,	5 00
M. L. Burdick, needle work,	3 00
W. C. Baker, 2 years old colt,	10 00
Charles Brooks, poultry,	7 00
T. D. Burrall, corn sheller,	6 00
B. T. Bliss, sweet potatoes,	3 00
T. Barker, 3 years old colt,	3 00

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	Miss Mary Bristol, domestic manufactures,	$1 00
	A. & H. Bowen, Jr., Hereford cattle,	80 00
	Miss Eliza Blackstone, painting,	5 00
	J. W. Bostwick, horses,	15 00
	A. Blount, horses,	25 00
	Chauncey Barrett, geldings,	10 00
	E. Burrell, horses,	10 00
	Jacob Brown, bulls,	30 00
	C. D. Bent, cattle and corn,	23 00
	Thomas Betts, sheep,	20 00
	B. G. Bliss, carpet coverlet,	4 00
	George Benedict, horse,	15 00
	C. B. Burtis, fruit,	25 00
	Bunts & Barrett, potatoes,	5 00
	O. Bartholomew, honey,	5 00
	Brodie & Converse, cattle,	28 00
	Wm. M. Bullock, bull,	15 00
	Miss Emily Brown, butter,	6 00
	Mrs. A. Barney, linen diaper,	6 00
	Mrs. T. K. Bates, oil painting,	3 00
	Mrs. Seymour Bailey, needle work,	5 00
	Lewis Beardsly, seed corn, (1855),	2 00
	Miss A. O. Bear, butter,	6 00
	Sylvanus Burtis, cattle,	35 00
	Miss J. A. Beebe, embroidery,	1 00
C.	—J. M. Camfield, cheese,	20 00
	R. G. Coffin, bull,	5 00
	C. C. Chadwick, horse,	5 00
	R. Coates, horse, bull and swine,	46 00
	John Chamberlain, wheat,	5 00
	J. B. Champlin, horse,	8 00
	Thomas Crary, stallion,	3 00
	G. Clarke, bull and oxen,	30 00
	George R. Comstock, cheese press,	2 00
	John Collins, heifer,	5 00
	G. A. Child, horse,	20 00
	Truman Coon, horses,	25 00
	E. G. Cook, cattle and swine,	165 00
	E. H. Cole, horse,	5 00

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	Robert Cotton, plowing,	$8 00
	G. W. Collins, do	10 00
	W. N. Cole, do	10 00
	G. W. Collins, sheep and poultry,	28 00
	A. B. Carter, 10 yoke oxen,	20 00
	Mortimer Crane, 1 year old colt,	5 00
	Hiram Converse, fowls and vegetables,	10 00
	L. P. Clark, embroidery,	1 00
	Charles L. Comings, carpet,	4 00
	A. F. Chatfield, flowers,	8 00
	G. W. Collins, grade cow,	5 00
	B. S. Carpenter, butter, &c.,	32 00
	E. G. Cook, sheep,	8 00
	George Chamberlin, steers,	8 00
	A. Chamberlin, sheep,	3 00
	S. Cone, squashes,	3 00
	H. Cooper & Co., agricultural implements,	25 00
	I. Clark, grapes,	3 00
	Mrs. O. Childs, needle work,	1 00
	Cowing & Co., pumps,	5 00
D.	William Davis, Durham bull,	15 00
	N. M. Dart, sheep, and Devon bull,	53 00
	John Dack, sheep,	8 00
	A. J. & A. Dike, sheep,	34 00
	D. A. Delano, pumpkin,	2 00
	H. G. Dickinson, peaches,	9 00
	Elisha Dorr, fruit,	20 00
E.	Gertrude Ely, quilt,	3 00
	Egbert H. Eddy, Jefferson co. team,	50 00
	W. L. Eddy, plowing and roller,	7 00
	Mrs. F. Emerson, churn,	3 00
	C. B. Eastman, sheep,	13 00
F.	Nelson Fry, cheese and boxes,	22 00
	Patrick Farrell, spading,	8 00
	S. R. Farwell, poultry,	5 00
	Finlay Fraser, cart,	5 00
	Fairbanks, Wilmot & Co., saw-mill,	10 00
	Abner Fitch, working oxen,	20 00
	S. E. Fields, blankets,	6 00

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	Fisk & Little, prem. expenses,	$152 67
G.—	John Greenwood, coverlet,	6 00
	Thomas Gould, bull,	25 00
	Amos Goulding, rye,	5 00
	Stephen Grimes, spading,	10 00
	Gill & Brothers, cattle,	55 00
	M. Galim, embroidery,	3 00
	H. Graves, carpet,	4 00
	P. E. Graves, needle work,	3 00
	O. A. Graves, corn,	5 00
	Green & Maxon, sheep and swine,	100 00
	Joseph Goodale, domestic goods,	6 00
H.—	C. S. Hubbard, needle work and painting,	6 00
	P. F. Hubbard, needle work,	2 00
	H. H. Harington, watermelons,	2 00
	Hungerford & Brodie, cattle, sheep and swine,	218 00
	Truman Hungerford, colt and heifer,	40 00
	Mrs. L. G. Hoyt, chair,	1 00
	Miss Sarah L. Helmer, wax work,	2 00
	B. F. Hotchkiss, poultry,	2 00
	Austin Hains, cow,	25 00
	A. C. Hall, carpet,	6 00
	O. Howland, sheep, cattle, &c.,	69 00
	J. H. Hawthorne, stallion,	10 00
	E. D. Hallock, saw mill,	8 00
	John G. Hermans, stallion,	25 00
	M. A. Hughes, silk bonnets,	2 00
	M. L. Hungerford, carpet, &c.,	10 00
	Samuel Herrick, chickens,	3 00
	H. F. Humphrey, cow,	20 00
	Albert Horr, swine,	8 00
	C. Hunt, rug carpet,	6 00
	Mrs. W. W. Herrick, shell work, &c.,	8 00
	E. S. Hayward, fruit, &c.,	30 00
	D. S. Heffron, poultry, &c.,	46 00
	Wm. Hungerford, stallion colt,	10 00
	Mrs. G. Hardy, quilt,	3 00
	Henry Holmes, cheese,	5 00
	James Halleck, vegetables,	5 00

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	Anson Hungerford, horses,	$10 00
	Mrs. W. W. Herrick, pencil drawing,	3 00
	Mrs. H. Hayward, wax flowers,	3 00
	H. B. Hurlbut, poultry,	2 00
	Mrs. B. F. Hunt, domestic goods,	2 00
I.	—Jerome Ives, rag carpet,	2 00
J.	—G. W. Jenks, poultry,	2 00
	L. Jacobs, mare and colt,	5 00
	C. A. Jordison, ewes and buck,	20 00
	W. Johnson, bull,	25 00
K.	—Elijah Kingsley, butter,	10 00
	J. G. Kraker, fanning mill,	5 00
	H. M. Kimball, butter and turnips,	18 00
	Horace Kimball, flannel and thread,	7 00
L.	—Robert Lovett, medals,	262 50
	M. H. Lines, harness,	17 00
	E. Little, straw cutter,	3 00
	F. Lansing, jr., fowls,	2 00
	Robert Lovett, medals,	13 00
	J. R. Lyon, cattle,	15 00
M.	—Mrs. J. M. Mitchell, woolen carpet,	8 00
	Nicholas McCabe, spading,	5 00
	Pliment Mattoon, seed corn,	2 00
	Mrs. J. S. McBride, cloak,	3 00
	Edwin March, horses,	15 00
	J. E. Morgan, wagon, &c.,	10 00
	Edward Maynard, carrots,	3 00
	R. D. Murray, native cow,	5 00
	E. Marks, cattle,	20 00
	Levi Marshall, hops,	5 00
	H. N. Millard, sugar,	3 00
	John M'Donald, sheep,	35 00
	Henry L. Monroe, horse,	5 00
N.	—Milton, G. Norton, bull and sheep,	15 00
	Robert Newton, plowing,	4 00
	Mrs. H. K. Newcomb, silk bonnets,	3 00
O.	—Enoch Ottley, cattle,	5 00
	W. P. Ottley, grain,	21 00
	C. A. Ostrander, seed corn,	3 00

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	J. E. Orvis, bull calf,	$3 00
	Datus Osmer, yoke steers,	8 00
	L. D. Olney, cabbage,	3 00
	Enoch Ottley, cattle,	43 00
P.—	Rich. H. Pease, fanning mill,	3 00
	E. P. Prentice, stock,	133 00
	P. H. Powers, cheese,	15 00
	G. C. Parker, fringe mittens,	1 00
	Rich. H. Pease, portable grist mill,	6 00
	Miss E. Patridge, chair,	2 00
	A. C. Palmer, horse,	15 00
	M. R. Patrick, riding horse,	10 00
	Chester Phippin, bed quilt,	1 00
	James Pierce, peaches,	3 00
	E. G. Potter, water elevator,	5 00
	A. G. Pierce, colt,	15 00
	M. S. Pettit, onions,	2 00
	G. F. Paddock, vegetables,	10 00
	Franklin Parker, bed quilt,	2 00
	George Parish, horse,	25 00
	Amos Phillips, plowing,	6 00
	George Parish, vegetables,	9 00
R.—	Miss L. M. Riggs, needle work,	1 00
	C. Richardson, fringe mittens,	2 00
	Henry D. Rich, horse,	15 00
	A. M. Rogers, heifer, 2 years old,	29 00
	Wm. Richey, boar and oats,	13 00
	G. L. Read, maple sugar, &c.,	18 00
	M. C. Remington, Hereford cattle,	116 00
	Miss Sarah Rogers, bed quilt,	3 00
	William Roddick, bull,	10 00
	Cyrus W. Reed, domestic manufacture,	8 00
	Mrs. S. M. Robinson, painting,	5 00
S.—	H. A. Sandusky, working oxen,	10 00
	M. Salsbury, turkeys,	3 00
	do oxen,	35 00
	H. A. Sandusky, do,	15 00
	John Spencer, buck,	10 00
	L. G. Snell, blankets,	8 00

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	A. G. Sigourney, squash,	$1 00
	John C. Sterling, floral ornaments,	5 00
	M. B. Scovill, turkeys,	2 00
	A. P. Sigourney, swine,	5 00
	Charles F. Smith, tomatoes,	3 00
	J. Steers, Jr., horses, &c.,	9 00
	Jesse Staplin, mare and colt,	20 00
	S. Stroud, colt,	10 00
	James Smith, grapes,	3 00
	C. Scripture, horse,	8 00
T.—	Mrs. A. Trowbridge, needle work,	4 00
	Charles Taylor, cheese press,	5 00
	D. R. Talcott, bed quilt,	1 00
	Nathan Talcott, apples,	5 00
	John W. Taylor, fat cattle,	39 00
	D. M. Todd, butter,	10 00
	Thorp, Smith & Hanchett, flowers and plants,	33 00
V.—	Mrs. J. T. Van Namee, domestic goods and flowers,	65 00
	R. H. Van Rensselaer, cattle,	98 00
	Giles Vroman, sweet potatoes,	2 00
	C. Van Benthuysen, premium expenses,	185 92
	Mrs. George Volam, quilt,	2 00
	Aaron Vail, (1854) sheep,	5 00
W.—	James B. Wright, corn cob crusher,	5 00
	George Webb, sheep,	8 00
	do do	5 00
	Isaac Wait, grist mill,	8 00
	W. L. Wait, 2 year old steers,	3 00
	A. F. Wood, cattle and sheep,	26 00
	E. G. Wait, stallion,	5 00
	E. Warner, horse,	10 00
	G. W. White, stallion,	10 00
	John Winslow, cheese and corn,	12 00
	G. B. Wright, sheep,	23 00
	Augustin R. Wright, chickens,	2 00
	J. C. Wood, rug,	3 00
	Wood & Eastman, sheep,	13 00
	S. B. & S. F. Woolworth, sugar,	5 00
	Henry Wier, seeds and domestic goods,	39 00

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J. M. Wilcox, apples,	$5 00
Miss Emily Wells, needle work,	3 00
John Wilson, flowers and fruit,	26 00
John C. Wright, barley,	5 00
E. W. Waters, butter,	5 00
Mrs. William Wood, embroidery,	4 00
A. M. Woodward, and Samuel Wilson, rabbits,	5 00
A. J. Wynkoop, colt, (1855)	10 00
Miss Amelia S. Waters, butter,	9 00
Mrs. Royal Wilcox, domestic goods,	4 00
Wood & Eastman, cattle and sheep,	20 00
Mrs. Jane Welling, linen,	6 00
Mrs. George W. Wilcox, bouquet, (1855)	2 00
Z.—John H. Zimmerman, butter,	15 00

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INDEX TO THE TRANSACTIONS OF THE NEW-YORK STATE AGRICULTURAL SOCIETY.

VOLUME I. TO XVI.

The Transactions of the State Agricultural Society, having now reached the sixteenth volume, the whole work presents to the farmer a mass of facts and observations, which embody every varied duty of his vocation, and nearly every principle which governs those duties and facilitates their accomplishment.

Every one having occasion to refer to the work, has found much difficulty in readily finding the volume to attest the facts in relation to any one object, and may be likened to the annoyance derived from an imperfect lock and bad key to a well stored and rich granary.

The period has arrived when "The Transactions" will be consulted by every careful farmer who desires to know the experience and practice of others—farmers and intelligent men in our own as well as other countries—in regard to modes of cultivation, as well as the light which science has thrown upon agriculture. But it will prove an impediment to many, that no direct means exist for concentrating the knowledge contained in these volumes upon any given subject.

To facilitate a reference to the work, which has often been called for, an index has been compiled; and when the farmer or man in pursuit of science connected with agriculture may desire to ascertain how far the Society can aid him in research, a few minutes devoted to the index will point out all it possesses in print, and the pages to be consulted.

Every contributing author will find his name in the index, and the title of his work. The action of the Society is indicated

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under the various heads, and all important proceedings will be found noticed.

It is hoped that this index will accomplish what is designed, and facilitate an examination of the valuable articles contained in the Transactions.

B. P. JOHNSON, *Secretary.*

INDEX TO THE TRANSACTIONS OF THE NEW-YORK STATE AGRICULTURAL SOCIETY—VOL. I. TO XVI.

A.

Ackerly, D., agriculture Richmond co., vol. ii, 188, vol. iii, 454
Act appropriating funds for agriculture, and encouragement of,.....vol. i, 12
Act incorporating society,.....vol. i, 8
Adams, Myron, manufacture corn stalk sugar,.....vol. iii, 123
Addresses:—
M. Sterling,.....vol. i, 32
L. F. Allen,.....vol. i, 38, vol. vii, 98, vol. viii, 153
H. Baldwin,.....vol. i, 42
J. B. Nott,.....vol. i, 78
W. P. Van Rensselaer,.....vol. iii, 368
W. H. Seward,.....vol. ii, 7, vol. iii, 75
J. P. Beekman,.....vol. iii, 64, vol. iv, 34
James S. Wadsworth,.....vol. i, 76
M. Van Buren,.....vol. iii, 72
Francis Granger,.....vol. iii, 73
Daniel Webster,.....vol. iii, 78
J. W. Knevels,.....vol. iii, 102
George Bancroft,.....vol. iv, 12
Josiah Quincy, jr.,.....vol. v, 14
B. P. Johnson,.....vol. v, 31, vol. xiv, 583
J. M. Sherwood,.....vol. vi, 27
Silas Wright,.....vol vii, 13
John A. King,..vol. vii, 31, vol, viii, 175, vol. ix, 149
D. S. Dickinson,.....vol. iii, 355
J. P. Norton,.vol. vii, 62, vol. viii, 55, vol. x, 270, vol xi, 161
Caleb Lyon,.....vol. x, 253, vol. xiv, 589

Digitized by Google

Addresses:—
George Vail,.....vol. vii, 85
A. H. Stevens, ...vol. vii, 518
John C. Spencer,.....vol. viii, 33
E. Emmons,.....vol. viii, 138
Amos Dean, ...vol. x, 14
A. J. Downing,.....vol. x, 119
E. P. Prentice, ...vol. x, 128
J. Delafield, vol. x, 131, vol. xi, 142, vol. xiii, 535, 556
address at show grounds, ...vol. xi, 22
address at annual meeting,.....vol. xi, 183
S. A. Douglass, ...vol. xi, 20
Horatio Seymour,.....vol. xii, 23
Henry Wager,.....vol. xii, 188
John A. Dix,.....vol. vii, 13, vol. xi, 597
Alonzo L. Fish, to judges Herkimer co.,..vol. xii, 414
T. B. Arden,.....vol. xii, 514
J. Battey, ...vol. xii, 380
F. S. Martin,.....vol ix, 459
A. Byington,.....vol. xii, 487
O. Bowne,.....vol. xii, 541
H. Murray, ... vol. x, 279
W. R. Coppock, ...vol. xii, 401
G. Geddes,.....vol. xii, 470, vol. xiv, 509
Charles King,..... vol. xii, 531
S. Knowlton,.....vol. xii, 558
Samuel Cheever,.....vol. xv, 17–97, vol. xiv, 86
Rev. Dr. Lintner,.....vol. xii, 572
J. N. Holmes,.....vol. xiv, 557
W. C. Rives, ...vol. xiii, 19
L. G. Morris,.....vol. xiii, 210
Rev. Edward Lord, ...vol. xiv, 566
William Kelly,.....vol xiii, 219, vol. xiv, 69
Gen. Vielie, ...vol. xiv, 603
D. Skinner, ...vol. xiii, 441
C. R. Bond, ...vol. xiii, 472
H. T. Brooks, ...vol. xiv, 671
J. H. Bennett,.....vol. xiii, 498
William Tracy, ...vol. xiii, 507

Digitized by Google

Addresses :—
J. J. Mapes,.....vol. xiii, 588
A. B. Dickinson,.....vol. xiii, 645, vol. xiv, 417, 420
Gov. J. A. Wright,.....vol. xv, 21
Agreements, proprietors and laborers,.....vol. viii, 433
Agricultural college, ...vol. vi, 1, vol. x, 133, vol. xi, 197
Agricultural education, report on,.....vol. iv, 372
resolution on, ...vol. vii, 99, vol. viii, 5
remarks on,.....vol. viii, 513, vol. ix, 584
W. Buckland, ...vol. ix, 70
discussion on, ...vol ix, 584, vol. x, 7, vol. xi, 12
Jason Clark, remarks on,.....vol. x, 250
Amos Dean, do .....vol. x, 15
H. Murray, do ..... vol. xii, 496
Agricultural discussion on, plowing,.....vol. vi, 449
agricultural schools, ...vol. vi, 465, vol. viii, 596, 600
agriculture of Belgium, ...vol. vi, 482
manures,.....vol. vi, 496, vol. vii, 510, vol. viii, 673
fruits,.....vol. vi, 512, vol. vii, 553
food of plants, ...vol. vii, 518
sub-soiling and deep plowing,.....vol. vii, 534
sheep and sheep husbandry,.....vol. vii, 537
fruits and fruit culture, ...vol. vii, 557, vol. ix, 594
dairy,.....vol. vii, 570
Russia, a producer for Europe,.....vol. viii, 638
culture of wheat,.....vol. viii, 645, vol. ix, 597
corn or grain weevil of Europe, by J. E. Gavit, vol. viii, 656
draining, ...vol. viii, 662
fattening of cattle,.....vol. viii, 667
agricultural education, ...vol. ix, 584
drouth,.....vol. xiv, 181
dairy interests, ...vol. xiv, 202
cattle for fattening,.....vol. xiv, 224
Agricultural interests, promotion of,.....vol. v, 416
early condition of,.....vol. x, 481
Indian, condition of,.....vol. x, 386
Agricultural meetings, vol. iv. 133, 243, vol. viii, 596, vol. ix, 584

Digitized by Google

Agricultural dynamics, (the implements of agric'lture,) J. J. Thomas,.....vol. x, 617
rooms, Albany,.....vol. iii, 657, vol. x, 115,
Schools, vol. ii, 149, vol. vi, 12, 38, 465, 661, vol. vii, 99, 477, vol. viii, 5, 600, 631, vol. ix, 62, 525
Europe, do. .....vol. xi, 200, 547
Agricultural Societies, influence of,.....vol. vii, 470
advantages of,.....vol. viii, 380
Royal,.....vol. xi, 8
fairs, benefit of,.....vol. x, 559
forms of association under act of 1855,....vol. xv, 671
science, ...vol. x, 237
Agricultural State board, ...vol. i, 78
Agricultural statistics, vol. v, 380, vol. vii, 641, vol. viii, 13, vol. ix, 415, vol. ix, 440, (see statistics), vol. xi, 432
productions,.....vol. xi, 434
decrease and increase,.....vol. xi, 457
Agricultural surveys,.....vol. vii, 35
Washington county, vol. vii, 35, vol. viii, 875, vol. ix, 753
letter from Dr. Fitch,.....vol. vii, 38
Seneca county,.....vol. ix, 10, vol. x, 350
Madison county, ...vol. xi, 658
Essex county, ...vol. xii, 6, vol. xiii, 704
Agrilus ruficollis, raspberry bug,.....vol. vi. 374
Agricultural prize essay, by W. P. Prentice,.....vol. xiv, 165
Agriculture of Putnam county, ... vol. i, 151
England, ... vol. i, 183
Queens county, vol. i, 158, vol. ii, 186, vol. xi, 602
Herkimer county,..... vol. i, 125
Pennsylvania,.....vol. i, 165
South Carolina,.....vol. i, 164, vol. iv, 337
Ontario county, ...vol. i, 150
Virginia,.....vol. i, 171
Washington county, ...vol. i, 161, vol. ii, 216
Cortland county, ...vol. i, 131, vol. ii, 151
Dutchess county,.....vol. i, 133
Saratoga county, ...vol. i, 159
Onondaga county,.....vol. ii, 174

Digitized by Google

Agriculture of Genesee county,.....vol. ii, 162, vol. xi, 511
Chautauque county, ...vol. ii, 142
Westchester county,.....vol. ii, 217
Cayuga county, vol. i, 126–9,vol. ii, 139, vol. xi, 462, vol. xii, 364
Chemung county,.....vol. ii, 143
Indiana, ...vol. ii, 221, vol. iv, 358
Oneida county, ...vol. ii, 167, 173, vol. iv, 367
Richmond county,.....vol. ii, 188, vol. iii, 454
Seneca county,..... vol ii, 214, vol. ix, 550
Maryland, ...vol. ii, 223
Erie county,.....vol. iii, 437
Wayne county, ...vol. iii, 448
Tompkins county,.....vol. iii, 443
Connecticut,.....vol. iv, 364
Illinois, ... vol. iv, 360
Addison county, Vt.,.....vol. iv, 362
Mississippi,.....vol. iv, 349
Hartford and Windsor counties, Conn. vol. iv, 264
Winnebago,..... vol. iv, 360
Belgium,.....vol. vi, 482
Wyoming county, ...vol. vii, 777
Vermont, ...vol. vii, 387, vol. viii, 380
Russia, ...vol, viii, 638
Schoharie county, ...vol. ix, 433
Tioga county, ...vol. ix, 435, 439
Yates county,.....vol. ix, 440
California, ...vol. xi, 423
Jefferson county, ...vol. ix, 499, vol. xiii, 467
Rensselaer county, ... vol. xiv, 605
essay on European agriculture, ...vol. ix, 24
early friends of,.....vol. xi, 188
Agriculture, essay on,.....vol. ii, 289
an ennobling science,.....vol. iii, 380
its defects and destinies,.....vol. iii, 368
condition of in 1843,.....vol. iii, 437
importance and influence of,.....vol. iii, 355
Legislative beneficence to,.....vol. iii, 403
policy of the interests of,.....vol. iii, 391

Digitized by Google

Agriculture, report on,.....vol. iii, 1
promotion of in Massachusetts,.....vol. iv, 392
report on, by Dr. Lee,.....vol. iv, 47
report on, 1846,.....vol. v, 64
report on, 1847,.....vol. vi, 23
report on, by Beckwith,.....vol. vii, 1
principles of,.....vol. vii, 392
report of the commissioners,.....vol. viii, 631
science, Hon. E. Graves,.....vol. x, 237
source of happiness,.....vol. i, 414, vol. x, 414
Allen, A. B., on the plow,.....vol. vi, 229
agriculturist,.....vol. x, 541
Allen, Lewis F., Vice President,.....vol. v, 29
President,.....vol. vii, 59
address,.....vol. viii, 153
copy for Legislature,.....vol. viii, 182
resolution for college,.....vol. ix, 70
for funds,.....vol. xi, 204
premium barn,.....vol. xiii, 221–248
Alum, native mineral, Lodi,.....vol. x, 465
analysis of,.....vol. x, 610
America, producer of food for Europe,.....vol. viii, 641
American farmers' rights and duties,.....vol. iii, 411
trees,.....vol. vi, 390, vol. vii, 102
Agricultural association,.....vol. viii, 592
fruits,.....vol. viii, 136
Linen company,.....vol. xii, 92
Analysis of French green sand,.....vol. i, 278
English sand and Mass. sand,.....vol. i, 278
New Jersey sand,.....vol. i, 278
English wheat soil,.....vol. i, 290
alluvial of the Nile,.....vol. i, 291
soils,.....vol. iv, 61
rice and rice crops,.....vol. iv, 343
wheat,.....vol. iv, 151
average crops,.....vol iv, 154
muck and soils,.....vol. v, 508
wheat and wheat straw,.....vol. vii, 70
beans, turnips, potatoes.....vol. vii, 70

Digitized by Google

Analysis of blood,.....vol. vii, 77
of Onondaga salt,.....vol. vii, 277
of Indian corn, ...vol. viii, 677
tomato, egg plant and okra,.....vol. viii, 370
apple and rhubarb,.....vol. ix, 737
cherries and gooseberries, ...vol. ix, 743
marl in Herkimer,.....vol. ix, 499
peach and pear,.....vol. ix, 743
tobacco,.....vol. ix, 230
plants and grasses, see Norton's Elements, vol. ix, 651, 721
apples, ...vol. ix, 37
organic substances in crops, ...vol. ix, 691
peas, beans and wheat, ...vol. ix, 651
sea weeds, ...vol. ix, 663
soil, plant and animal, ...vol. ix, 664
guano,.....vol. ix, 670
marl, ...vol. ix, 674
wood and coal ashes, ...vol. ix, 680
saline manures, ...vol. ix, 680
milk and butter, Ayrshire, Jersey and common milk, vol. x, 326
Jerusalem artichoke,.....vol. x, 339
parsnips, ...vol. x, 347
grain and grass seeds, ...vol. x, 616
limestones,.....vol. x, 610
marls,.....vol. x, 611
soils of farms,.....vol. x, 613
springs, ...vol. x, 473
water lime,.....vol. x, 610
Dr. Salisbury, rocks, soils, &c.,.....vol. x, 710
vegetable oyster, carrot, beet,.....vol. xii, 323–8
endive,.....vol. xii, 331
celery, melon, cucumber,.....vol. xii, 333–7
soils and crops,.....vol. xiii, 496, 502
Andrews, W., on the Island of Malta,.....vol. iv, 325
Angola grass,.....vol. vi, 239
Annual meetings, 1832,.....vol. i, 5
Albany, 1841,.....vol. i, 8
Syracuse, 1841,.....vol. i, 29

Digitized by Google

Annual meetings, Albany, 1842, ... vol. i, 63
Albany, 1842, ... vol. ii, 20
Albany, 1843, ... vol. ii, 5
Rochester, 1843, ... vol. iii, 19
Albany, 1844, ... vol. iii, 12
Poughkeepsie, 1844, ... vol. iv, 6
Albany, 1845, ... vol. iv, 31
Utica, 1845, ... vol. v, 4
Albany, 1846, ... vol. v, 27
Auburn, 1846, ... vol. vi, 3, 50
Albany, 1847, ... vol. vi, 11
Saratoga, 1847, ... vol. vii, 6
Albany, 1848, ... vol. vii, 55
Buffalo, 1848, ... vol. viii, 24
Albany, 1849, ... vol. viii, 135
Syracuse, 1849, ... vol. ix, 12
Albany, 1850, ... vol. ix, 143
Albany, 1850, ... vol. x, 8
Albany, 1851, ... vol. x, 111
Albany, 1852, ... vol. xi, 139
time of holding, changed, 1852, ... vol. xi, 204
Saratoga, 1853, ... vol, xiii. 8
Albany, 1854, vol. xiii, 193; 1855, vol. xiv, 59; 1856, vol. xv, 63
Annual reports, 1841, vol. i, 6; 1842, vol. ii, 1; 1843, vol. iii, 5; 1844, vol. iv, 3; 1845, vol. v, 3; 1846, vol. vi, 1; 1847, vol. vii, 3; 1848, vol. viii, 3; 1849, vol. ix, 3; 1850, vol. x, 3; 1851, vol. xi, 3; 1852, vol. xii, 3; 1853, vol. xiii, 3; 1854, vol. xiv, 3; 1855, vol. xv, 3
Apple, its uses and culture, ... vol. iv, 294
committee appointed to report a list of, for culture, vol. v, 29, vol. vi, 184
approved varieties, vol. viii, 277, vol. ix, 350, vol. x, 161
winter meeting, 1854, ... vol. xiii, 315
list of, ... vol. xiii, 54
Miller's seedling, ... vol. xiv, 56
Apple tree pests, essay by Dr. Asa Fitch, ... vol. xiii, 178
Arum, a new esculent, ... vol. v, 517

Digitized by Google

Artichoke, aualysis of, ... vol. x, 339
Ashes, experiment with, ... vol. xiv, 105
Atkins' self-raker and reaper, ... vol. xii, 112, vol. xiii, 92
Atmospheric phenomenon, 1854, ... vol. xiv, 189
Ayrault A., twin steers, ... vol. vii, 490
Ayrshire cattle, ... vol. ii, 263
report on, ... vol. v, 77
history of, ... vol. ix, 301, vol. x, 34
cow's milk, analysis, ... vol. x, 326, vol. xi, 407
report on, ... vol. xii, 145
points of excellence, ... vol. xiii, 84

B.

Baker, G. J., on the agriculture of Washington county, vol. ii, 216
Barberry, ... vol iii, 213
Bacon, Joel W., stock and farm, ... vol. x, 533
Barber, P., cheese dairy buildings, ... vol. xi, 267
Barker, David, manure, ... vol. xi, 416
Baldwin, H., remarks, ... vol. xi, 203
Bacon, W., fruits of Berkshire, ... vol. xiv, 140
Badger's horse power, ... vol. xv, 102
Barley culture, ... vol. ii, 59, 358, 397, vol. iii, 88
and cost, ... vol. iv, 185, vol. v, 303, vol. vi, 148
in Tompkins county, ... vol. vi, 641
in Madison county, ... vol. vii, 291
report on, ... vol. viii, 317, vol. ix, 324, vol. x, 148
statement of E. M. Bradley, ... vol. x, 149
crops, Seneca county, ... vol. x, 418
cost production, ... vol. x, 551
R. W. Hess, ... vol. xiii, 285
Monroe, ... vol. xiii, 489
Oneida, ... vol. xiii, 506
Onondaga, ... vol. xiii, 849
culture, ... vol. xiv, 91
cost to raise, ... vol. xiv, 122
premium crops. J. W. Tunicliff, Otsego, ... vol. i, 70
N. S. Wright, Oneida, ... vol. ii, 57
B. Bradley, Ontario, ... vol. iii, 88
G. Geddes, Onondaga, ... vol. iii, 83
J. B. Dudley, Ontario, ... vol. iv, 32

Digitized by Google

Barley, premium crops, H. Mills, Lewis county,.....vol. v, 203
C. Pomeroy, Ontario,.....vol. vi, 25
B. Enos, Madison,.....vol. vii, 83
M. Adams, Lewis,.....vol. viii, 178
E. M. Bradley, Ontario, vol. ix, 324, vol. x, 149
W. Baker, Livingston, ...vol. x, 148
E. R. Dix, Oneida,.....vol. x, 148
B. Enos, Madison,.....vol. xi, 276
E. R. Dix, Oneida,.....vol. xi, 277
W. Davidson, Otsego, ...vol. xi, 277
Seneca,.....vol. x, 418
Barns and sheds, Seneca county,.....vol. x, 516
Barn, L. F. Allen, premium,.....vol. xiii, 221-248
F. R. Elliot, plan of,.....vol. xiii, 256
Barry, P., on the horticulture of Western New-York, vol. iii, 467
Barstow, G. H., on the agriculture of Tioga co.,....vol. ix, 439
farming,.....vol. x, 302
Barton, tools,.....vol. xi, 126
Bateham, M. B., on the culture of madder,.....vol. iii, 186
on thorn hedges,.....vol. iv, 316
Bates, S., on the cranberry,.....vol. iv, 315
Beans, analysis of, ...vol. vii, 70
Bean culture, vol. iv, 189, vol. vi, 595, vol. vi, 637, vol. vii, 296, vol. viii, 317
in Herkimer,.....vol. viii, 471
Delaware, ...vol. x, 148
E. S. Salisbury, Jefferson,.....vol. xi, 280
D. Coonradt,.....vol. xiii, 293
Monroe, ...vol. xiii, 490
Onondaga,.....vol. xiii, 550
Rensselaer, ...vol. xiii, 595
Beckwith's report on Agriculture,.....vol. vii, 1
Beef and pork, curing of,.....vol. xii, 257, 95
packing, Thomas F. Devoe,.....vol. xii, 282
Thomas Grant,.....vol. xii, 287
B. P. Johnson,.....vol. xii, 295
Beekman, J. P., president,.....vol. iii, 1
on improving clay lands,.....vol. iii, 418

Digitized by Google

Beekman, J. P. on manures, ... vol. iv, 127
on wheat, ... vol. iv, 857
report on farms, ... vol. v, 163
resolution of thanks, ... vol. x, 127
report on Seneca county survey, ... vol. x, 350
resolutions of, (see addresses), ... vol. xi, 203
Bees, raising and management of, ... vol. ii, 225
Bee moth, ... vol. iii, 173
hives, ... vol. vi, 94, vol. x, 79
Beet culture, ... vol. ii, 63
and expense, vol. iii, 508, vol. iv, 192, vol. v, 329. vol. vi, 177
root for sugar, its cultivation, &c., by Professor Wilson, ... vol. xiii, 116, 131
analysis of, ... vol. xii, 8, 323
Belgium, the agriculture of, ... vol. vi, 482
Bell, Thomas, medal, World's Fair, ... vol. xi, 146
Bement, Caleb N., Vice President, ... vol. i, 10
on poultry, ... vol. i, 362
sub-soiling, and plow, ... vol. ii, 238
butter making, ... vol. iii, 641
on Osier willow, ... vol. xii, 315
Vice President, ... vol. vi, 19
Bennet, R., on hay-making, ... vol. xiii, 625
Betts, F. J., remarks of, ... vol. iii, 380
Bitumen, Seneca county, ... vol. x, 464
Bliss, E. C., account of his farm, ... vol. viii, 202
irrigation, ... vol. xv, 259
Blood, analysis of, ... vol. vii, 77
Bloomfield, Joseph E., on the agriculture of Oswego, vol. ix, 424
Bones as a manure, ... vol. vii, 369
dust as a manure, ... vol. x, 396
Borer, the, ... vol. i, 239
Bradish, Luther, ex. com., ... vol. vi, 18
American agricultural association, ... vol. viii, 592
Bradley, E. M., statement barley culture, ... vol. x, 149
Bread unfermented, how made, ... vol. xiii, 582
Breeding domestic animals, ... vol. iv, 243
S. Howard, article on, ... vol. xii, 297

Digitized by Google

Brick making,.....vol. iv, 457
Broom corn,.....vol. v, 340, vol. vii, 660, vol. viii, 476
cultivation,.....vol. xiv, 137
Brown, D. J., on the choice of trees and shrubs,.....vol. vi, 376
Buckland, W., on agricultural education,.....vol. ix, 70
Buckwheat culture,.....vol. ii, 393, vol. ix, 328
expense,.....vol. iii, 509
blue,.....vol. viii, 571
Seneca,.....vol. x, 418
cost production,.....vol. x, 552
C. W. Ells,.....vol. xiii, 287
Oneida,.....vol. xiii, 506
Buel, Jesse, corresponding secretary,.....vol. i, 5
his circular,.....vol. i, 6
Buel, William, premium farm,.....vol. v, 170
account of,.....vol. v, 187
Vice-President,.....vol. vi, 18, vol, x, 113
Buffalo fair, 1848,.....vol. vii, 100
gas work,.....vol. viii, 124
Buildings, farm, Thomas,.....vol. ii, 121
Mitchell,.....vol. ii, 125–130
Downing,.....vol. v, 234
Niven,.....vol. ii, 130, vol. vi, 122, vol. vii, 226, 227
Ellicott,.....vol. viii, 252
Burgess, Volney, potato experiments,.....vol. xiii, 302
Burnet, J. B., Vice President,.....vol. ix, 1
Ex. Committee,.....vol. x, 113
Burrall's reaping machine,.....vol. xii, 112
Burrows, Jabez, on the agriculture of Chautauque co., vol. ii, 142
Burroughs, Silas M., Vice President,.....vol. x, 113
Bush, Andrew, on the rot of potatoes,.....vol. v, 342
Butter, making, by C. N. Bement,.....vol. iii, 641
premiums offered,.....vol. i, 64
report on, 1842,.....vol. ii, 39
making,.....vol. ii, 349 379
in Cayuga county,.....vol. iii, 569, 571
making in winter,.....vol. iii, 640
making in various counties,.....vol. iv, 216
making,.....vol. v, 110, vol. vi, 73

Digitized by Google

Butter, dairies, ... vol. vi, 144
of Queens county, vol. vi, 609, vol. vii, 732, vol. xiii, 580
Rensselaer county, ... vol. vi, 613
Wyoming county, ... vol. vi, 653
navy, for foreign stations, ... vol. vii, 43
making in 1847, ... vol. vii, 148
dairies, ... vol. vii, 273
of Goshen, ... vol. vii, 572
fraud in, ... vol. vii, 572
Irish method of making, &c., ... vol. vii, 46
report on, ... vol. viii, 10
form for statements of, ... vol. viii, 434
in Ontario, large yield, ... vol. viii, 506
report by B. P. Johnson, ... vol. ix, 298
dairies, report on, ... vol. ix, 310
causes of bad, ... vol. ix, 312
report by committee, ... vol. ix, 102
statement by Horace Clapp, ... vol. ix, 311
analysis of, ... vol. x, 326
report, ... vol. x, 76
report of H. Wager, ... vol. x, 135
from milk of Alderney, ... vol. x, 327
each town Seneca county, ... vol. x, 418
demand and supply, ... vol. x, 544
winter make, ... vol. xi, 268
manner making, I. Denio, ... vol. xi, 269
N. Hitchcock, ... vol. xi, 270
Goshen, how made, ... vol. xi, 532
Ballard & Worden, ... vol. xii, 213
method of manufacture, R. Bennet, ... vol. xiii, 626
yield per cow, ... vol. xiii, 626
A. B. Dickinson as to manufacture, ... vol. xiii, 645
making, A. A. Hall, ... vol. xiii, 609
butter land, ... vol. xiii, 647
J. Ballard 2d, ... vol. xiii, 270
dairies, Jefferson, ... vol. xiii, 462
statements of making, ... vol. xiv, 38-42, 217
Welsh method, ... vol. xiv, 217

Digitized by Google

Butter, Orange co,.....vol. xiv, 218, 543
product from 5 cows,.....vol. xiv. 114
dairies,.....vol. xiv, 443
statistics of, Delaware county,.....vol. xv, 578
and cheese, Steuben co.,.....vol. xv, 636

C.

Callanan James, account of his farm,.....vol. vi, 111
California, agriculture of,.....vol. xi, 423
Campbell, T. B., on the agriculture of Chautauque co., vol. ii, 141
Canada thistle, essay on, by A. Stevens,.....vol. vi, 405, 429
Seneca,.....vol. x, 512
how killed,.....vol. xiii, 625, vol. xiv, 93, 112, 683
essay on,.....vol. xiv, 681, 683
Capital, application of,.....vol. ii, 284
nature and value of labor and wages,.....vol. x, 555
and products of trade, Madison co.,.....vol. xi, 752
Car wheels for railroads,.....vol. xi, 127
Carl, Albert G., on the agriculture of Queens co., vol. i, 158, vol. ii, 186
Carl, Abraham, description of farm,.....vol. xiii, 674
grass seeds, wheat, and sod plowing,.....vol. xiii, 674
plows 8 to 10 inches deep, corn,.....vol. xiii, 676
Carrot culture,.....vol. ii, 64, 93, vol. iv, 191, vol. v, 321, vol. vi, 173, vol. vii, 309, vol. viii, 327
N. & E. S. Hayward,.....vol. xiii, 294
Onondaga,.....vol. xiii, 549
analysis of,.....vol. xii, 323, vol. xiii, 294
wild, how destroyed,.....vol. xiv, 113
Cashmere Goats, Dr. Davis,.....vol. xiv, 20
Catalogue of the library,.....vol. ix, 23
additions to,.....vol. x, 29
Cattle, essay on,.....vol. i, 249
best breeds of,.....vol. i, 268
breeds of,.....vol. i, 271
points of well-bred,.....vol. i, 268
crossing breeds,.....vol. ii, 257
Ayrshire, vol. ii, 263, vol. iv, 251, vol. v, 77, vol. ix, 301 vol. xi, 407

Digitized by Google

Cattle, milch cows,.....vol. ii, 397
native and cross breeds,.....vol. ii, 265
report on, 1842,.....vol. ii, 19
Scottish,.....vol. iii, 195
improved breeds,.....vol. iii, 192
breeds in England,.....vol. iv, 249
fodder,.....vol. iv, 210
soiling,.....vol. iv, 236, vol. vi, 293, 693
breeds for New-York,.....vol. v, 409
consumed in New-York,.....vol. v, 510
native, report on,.....vol. v, 79, vol. vi, 54
Galloway, S. Howard,.....vol. vi, 283
B. P. Johnson,.....vol. vi, 292
foreign stock,.....vol. vi, 104
grade, report on,.....vol. v, 78, vol. vi, 53
fattening and feeding,.....vol. vii, 115
report on various breeds,.....vol. vii, 104, vol. x, 32
fattening,.....vol. viii, 667
importation of,.....vol. viii, 378, vol. xiv, 224
imported,.....vol. ix, 460
Hungarian,.....vol. x, 41
Jersey or Alderney, by Col. Le Couteur of Jersey, vol. x, 317
Jersey cow, John A. Taintor,.....vol. x, 327
Jersey milk and butter,.....vol. x, 327
Seneca co.,.....vol. x, 530
cows, dairy, Cortland,.....vol. x, 223
Clinton co.,.....vol. xi, 488
premium on,.....vol. xi, 52–61
Devon, cows,.....vol. xii, 42
Hereford,.....vol. xii, 141
points of excellence,.....vol. xiii, 73
feeding,.....vol. xiii, 317
breeds of, in Jefferson, Monroe, Montgomery, and Ontario counties,.....vol. xiii, 469
foot rot how cured,.....vol. xiv, 430
cheapest food for,.....vol. xiv, 113
different breeds, management and diseases of, by W. C. Watson,.....vol. xv, 265–295

Digitized by Google

Cattle department at fair,.....vol. xiv, 18
Cayuga county, the agriculture of, vol. i, 126, 129, vol. ii, 139, vol. xi, 462, vol. xii, 364
products,.....vol. xiv, 396
Cayuga bridge and lake,.....vol. x, 409, 11
Celery, analysis of,.....vol. xii, 333–337
Chamberlain, O. C., vice-president,.....vol. vi, 18
Champlain Valley Horticultural Society,.....vol. xiv, 407
description of fruit,.....vol. xiv, 408
Charcoal, essay on,.....vol. i, 298
Chapin, Heman, on the best breeds of cattle,.....vol. i, 268
Chapman, U., on sheep,.....vol. ii, 277, vol. iv, 251
Chemung, agriculture of,.....vol. ii, 143
Chautauque county, the agriculture of,.....vol. ii, 141, 142
Chemistry, its relations to the soil,.....vol. ix, 210
Cheever, Hon. Samuel, vice-president,.....vol. vi, 18
education,.....vol. ix, 63
President,.....vol. xv, 63
remarks, Elmira,.....vol. xv, 11
address,.....vol. xv, 97
Chess, the tares of scripture,.....vol. x, 513, vol. xv, 245
Cheseboro, Elijah, farm,.....vol. xv, 569
Cherries, best varieties,.....vol. vii, 345
analysis of,.....vol. ix, 743
varieties of,.....vol. ix, 366, vol. x, 162
Chinese sugar cane,.....vol. xv, 248
China grass cloth,.....vol. ix, 384
Cheese premiums offered,.....vol. i, 68
report of committee on,.....vol. ii, 42
making,.....vol. ii, 342
making, Cayuga county,.....vol. iii, 567
in Chautauque county,.....vol. iii, 605
dairy and expenses,.....vol. iv, 220
making,.....vol. v, 118, vi, 76
dairies,.....vol. vi, 128
dairy premiums,.....vol. vi, 25
making,.....vol. vii, 155
dairies,.....vol. vii, 247
dairies in Fulton county,.....vol. vii, 636

Digitized by Google

Cheese in Herkimer county, ... vol. vii, 651
in Oneida county, ... vol. vii, 682
report on, ... vol. viii, 92
dairy, forms for statements, ... vol. viii, 434
composition of, ... vol. ix, 711
report on, ... vol. ix, 312, 105
report and method making English cheese, vol. x, 77
Seneca county, ... vol. x, 418
Adam's report, exports, &c., ... vol. xi, 87
house and dairy buildings, M. Eames, and P. Barber, vol. xi, 263–267
A. G. Ford, ... vol. xi, 241
Moses Eames and report on, ... vol. xii, 101, 214
manufacture, ... vol. xiii, 427
by W. C. Young, ... vol. xiii, 430
report, ... vol. xiii, 434
dairies, D. Spencer, ... vol. xiii, 608 to 623
press, ... vol. xiii, 99
making in England, ... vol. xiii, 271
John Winslow, ... vol. xiii, 278
dairies in Jefferson, ... vol. xiii, 464
in St. Lawrence, ... vol. xiii, 623
reports, vol. xiv, 42 to 48, 270, 377, 487, vol. xv, 43
dairy, Hon. G. Denniston, ... vol. xv, 44
Chidham wheat, ... vol. xiii, 174
Chopped food for cattle, ... vol. xiv, 114
Churn, improvement on, by J. Battey, ... vol. iv, 234
Circular to county societies, ... vol. vi, 660
as to crops, ... vol. xiv, 367, 8
Clapp, Horace, statement on butter dairies, ... vol. ix, 311
Clark, Jason, on agricultural education, ... vol. x, 250
Clarke, C. E., on seedling potatoes, ... vol. ix, 605
Clay soils, improved, ... vol. iii, 418
Clift, Leonard, on the Agriculture of Putnam county, vol. i, 151
premium farm, ... vol. xv, 129
Climate of New-York, by F. B. Hough, ... vol. xv, 189
Long Island, ... vol. xv, 623
Climatic,—temperature of Steuben, ... vol. xv, 638
Clover as a fertilizer, ... vol. iv, 206

Digitized by Google

Clover, analysis of,.....vol. x, 616
T. N. Tobey, statistics,.....vol. xii, 219
Clover seed culture and cost, vol. iv, 206, vol. vi, 157, vol. iv, 452
Coal anthracite,.....vol. xi, 127
Cobble stone walls,.....vol. ii, 372
Coe, John D., on Devon cattle,.....vol. x, 531
Coffin, G. W., statement of farm,.....vol. xiv, 104
Collins, F. W., report on poultry,.....vol. xi, 76
Colman, H., his death,.....vol. ix, 12
tribute to,.....vol. ix, 160
Crops,.....vol. xiv, 414
Comstock, E., on the farms of Oneida,.....vol. iv, 101
report on permanent location of fair,.....vol. xiii, 201
Commissioners' report on agriculture,.....vol. viii, 631
Constitution of the Society,.....vol. i, 9
amendments proposed,.....vol. i, 78
amendments,.....vol. iii, 102
amendment noticed,.....vol. v, 30
published with Transactions,.....vol. viii, 152
new,.....vol. viii, 1
new,.....vol. xi, 24
new proposed,.....vol. xii, 176, vol. xv, 7
Coppock, W. R., on Chidham wheat,.....vol. xiii, 174
Corn, 1st premium crops, W. Ingalls, Oswego,.....vol. i, 71
S. Phelps, Cayuga,.....vol. ii, 57
George Vail, Rensselaer,.....vol. v, 297, vol. vii, 285
E. W. Ells, Oneida,.....vol. vi, 24
E. R. Dix, Oneida,.....vol. ix, 320
P. Crispel, Jr., Ulster,.....vol. viii, 309, vol. x, 142
Seneca product,.....vol. x, 418
E. M. Bradley, Ontario,.....vol. xi, 267
cost, production and analysis,.....vol. xi, 553, 616
H. B. Crapsey, Richmond,.....vol. xii, 541
Corn stalk fodder,.....vol. iv, 204
sugar,.....vol. iii, 232, vol. v, 130
Egyptian,.....vol. xv, 248
Cortland, the agriculture of,.....vol. i, 131, vol. ii, 151
dairies, farms, &c.,.....vol. xiii, 401
Connecticut, agriculture of,.....vol. iv, 364

Digitized by Google

Conger, A. B., report on musical instruments,.....vol. xi, 134
Corresponding secretary, duties,.....vol. ix, 18
Jesse Buel, 1841,.....vol. i, 5
H. S. Randel, 1841,.....vol. i, 11
report, 1841, vol. i, 121; 1842, vol. ii, 136; 1843, vol. iii, 95
B. P. Johnson, 1844,.....vol. iii, 100
report, 1844,.....vol. iv, 43
Daniel Lee, 1845,.....vol. iv, 33
report, 1845,.....vol. v, 46
Joel B. Nott, 1846,.....vol. v, 29
report, 1846,.....vol. vi, 10
E. Emmons, 1848,.....vol. vii, 59
B. P. Johnson, 1848,.....vol. viii, 3
report, 1849, vol. ix, 3; 1850, vol. x, 3; 1851, vol. xi, 3; 1852, vol. xii, 3; 1853, vol. xiii, 3; 1854, vol. xiv, 3; 1855, vol. xv, 3; 1856, vol xvi, 3
Cost, Col. E., on light soils for wheat,.....vol. vi, 251
Cotton and flax, report on,.....vol. xi, 104
County Societies,.....vol. i, 6
appropriations for,.....vol. i, 12
organization of,.....vol. i, 14
importance of,.....vol. iii, 473, vol. ix, 454
County Presidents ex-officio members of the State Society, vol. i, 9
Cow house,.....vol. viii, 261
Cox, Gardner, on disease of potatoes,.....vol. x, 329
Cranberry culture,.....vol. iv, 315, vol. v, 501
Crispel, Peter, Jr., on Indian corn.....vol. viii, 313
his farm management,.....vol. vii, 212
Cropping, and special manuring,.....vol. ix, 654
Crops, Seneca, cost, &c.,.....vol. x, 493, 560
Cross-breed sheep, report &c.,.....vol. xiii, 90
Crocker, O. C. Vice President,.....vol. iv, 33
Crystal Palace, London, remarks on,.....vol. xi, 10
Cucumbers, analysis of,.....vol. xii, 333–337
Curculio,.....vol. i, 233
Currant moth,.....vol. vii, 461
Currants, best varieties,.....vol. ix, 373

Digitized by Google

Cultivators, trial of,.....vol. xii, 132
Culver A., potato department,.....vol. xiii, 305
Curtis, Daniel S., on cattle, sheep and root culture,...vol. i, 271
on fine wool sheep,.....vol. viii, 236
Curing hay,.....vol. xv, 181
Cut worm,.....vol. iii, 132

D

Diana grape,.....vol. xiv, 25
Dairy, committee,.....vol. v, 28
farm account of,.....vol. iv, 222
management,.....vol. iv, 214, vol. v, 100
(see also butter and cheese.)
report of,.....vol. vii, 256
discussion on,.....vol. vii, 570
house, description of,.....vol. viii, 264
building,.....vol. xi, 263–267
report on butter and cheese,.....vol. xii, 157, 61
buildings,.....vol. xii, 201
report, Onondaga,.....vol. xiii, 404
report, Jefferson.....vol. xiii, 464
report, St. Lawrence,.....vol. xiii, 623
interests,.....vol. xiv, 202
Dairies of Herkimer county, report on,.vol. ix, 497, vol. xi, 515
vol. xii, 412, vol. xiii, 432
B. P. Johnson,.....vol. vii, 247, 570, vol. ix, 298
Madison county,.....vol. xi, 728
stock, Wm. Stewart's, Herkimer,.....vol. xi, 728
Seneca,.....vol. x, 543
Horace Clapp,.....vol. xii, 202
dairy management in England,.....vol. xiii, 271
Jefferson,.....vol. xiii, 462
St. Lawrence, cheese,.....vol. xiii, 623
in Cortland county,.....vol. xiii, 401
census,.....vol. xiv, 202–3
Daisy, food for sheep,.....vol. xiv, 113
Danford & Co., reaping machine,.....vol. xii, 113
Davis, Dr., on cashmere goats,.....vol. 14, 20
Davies, Thos. L., Vice President,.....vol. iii, 1, vol.iv, 33
Dean, Amos, on agricultural education,.....vol. x, 15

Digitized by Google

Deer skins and mittens,.....vol. xiv, 57
Delafield, John, Vice President,.....vol. viii, 137
draining,.....vol. viii, 223
Seneca county,.....vol. viii, 550
Agriculture of Seneca,.....vol. ix, 550
report on draining,.....vol. ix, 273
essay on Indian corn,.....vol. ix, 280
Norton's Elements,.....vol. ix, 294
Adams' wheat experiments,.....vol. ix, 313
description of his farm,.....vol. vii, 200
report, Seneca county,.....vol. x, 350
statement farm labor and cost,.....vol. xi, 402
Agricultural statistics, No. 7, 7th census,..vol. xi, 432
death of,.....vol. xiii, 634
Delavan, H. W., Executive committee, 1832,.....vol. i, 5
Delavan, Edward C., Vice President,.....vol. i, 10, vol. ii, 5
Denniston, Robert, Vice President, vol. i, 10, vol. i, 76, vol. ii, 5
Denio, I., butter making, ...vol. xi, 269
Densmore's reaping machine,.....vol. xii, 114
Devon cattle, value of in England, 1841,.....vol. i, 198
report on,.....vol. vi, 50, vol. v, 77, vol. ix, 85
Seneca county,.....vol. x, 530
John D. Coe,.....vol. x, 531
awards,.....vol. x, 34
points of excellence,.....vol. xiii, 77
bulls, report, &c., ...vol. xiii, 87
Designs for farm buildings, vol. ii, 121, 125, 130, vol. v, 234, vol. vi, 122, vol. vii, 226, vol. viii, 252
Diseases and insects injurious to the wheat crop,.....vol. iii, 201
to Indian corn,.....vol. viii, 842
of potatoes, vol. v, 342, vol. vi, 667, vol. vii, 425, vol. viii, 403
and management of horses,.....vol. xv, 317, 332
Dodge, L. P. and W. F., pump,.....vol. xiii, 95
Domestic animals, insects injurious to,..vol. iii, 165, vol. iv, 243
Domestic manufactures, vol. ii, 38, 388, vol. vi, 81, vol. vii, 164, 766, vol. viii, 500, vol. x, 81
Doolittle, H. W., Vice President,.....vol. iv, 33
Doubleday, U. F., on the agriculture of Cayuga co., ..vol. i, 126

Digitized by Google

Douglass, hydraulic ram,.....vol. xiii, 101
Downing, A. J., on the construction of farm houses,..vol. v, 234
Drake, George, on breeds of cattle,.....vol. iv, 249
Draining,.....vol. i, 297
benefits,.....vol. ii, 285, vol. v, 54
J. P. Beekman,.....vol. vii, 230
by A. D. Spoor,.....vol. vii, 235
E. J. Wooley,.....vol. vii, 244
reports on,.....vol. viii, 223
recommended,.....vol. viii, 433
discussion on,.....vol. viii, 662
tile machine,.....vol. viii, 666
implements for,.....vol. viii, 235
report on,.....vol. ix, 273
remarks on,.....vol. ix, 278
in Chautauque county,.....vol. ix, 472
tile, sizes and forms,.....vol. ix, 129
tiles and pipes,.....vol. x, 521
in Richmond county,.....vol. x, 292
tile machine,.....vol. x, 292
report on, by John Johnston, vol. xi, 250, vol. xv, 257, 626
on Hethelwood farm, England,.....vol. xi, 246
importance of,.....vol. xi, 11
Madison county,.....vol. xi, 658
report on,.....vol. xii, 203
Monroe county,.....vol. xiii, 490
H. G. Foote, St. Lawrence county, experiments, vol. xiii 616, vol. xiv, 6, 80, 95, 100, 127, 180, 395, 397, 404, 445, 458, 486, 531, 547, 553, 586, 627, 637, 652, 681
an essay,....vol. xiv, 127, 180, vol. xv, 132, 139, 151
T. C. Maxwell,.....vol. xv, 253
by Wm. Johnson,.....vol. xv, 254
Drawings and paintings,.....vol. vii, 177
Dioscorea from Japan,.....vol. xiv, 27
Drift deposits, Seneca,.....vol. x, 475
Drill,.....vol. vii, 141, vol. xii, 117
Burrows & Emery,.....vol. xiii. 99

Digitized by Google

Drill, Woodward's, ... vol. xiii, 99
Bickford & Huffman, ... vol. xiii, 100
Foster, Jessup & Co., ... vol. xiii, 100
Seymour & Co. ..... vol. xiii, 100
Drought, vol. xiv, 4, 400, 407, 415, 442, 448, 463, 491, 495, 500, 545, 553, 581, 588, 614, 622, 640, 648, 652, 655
deep plowing favorable, ... vol. xiv, 100
discussion on, ... vol. xiv, 181
Dutchess county, agriculture of, ... vol. i, 133
institute, ... vol. vii, 631
Indian corn in, (5 acres,) ..... vol. x, 211
products of, ... vol. xii, 395
Durham cattle, report on, ... vol. v, 7, vol. vi, 50, vol. vii, 103
value of in England, 1841, ... vol. i, 197
report, ... vol. x, 33
Seneca, ... vol. x, 532
Dyer's madder culture, ... vol. iii, 186
Dynamics, prize essay, by J. J. Thomas, ... vol. x, 617

E.

Eastman, H. H., potato experiments, ... vol. xiii, 298
experiments with manures, ... vol. xv, 6
Eames, Moses, on the agriculture of Jefferson co., ... vol. ix, 499
cheese dairy, ... vol. xi, 263
Edgecomb, Jonathan, report on implements, vol. xi, 80, vol. xii, 353
Education, agriculture, ... vol. ii, 289
by John Greig, vol. iv, 372, vol. ix, 455, vol. ix, 70, 584
discussion, ... vol. ix, 62
see also, Agricultural education and schools, its condition and progress, vol. x, 604
Agricultural, ... vol. xi, 12
intelligence, advantages, ... vol. xiii, 563
Effects of Legislative beneficence, ... vol. iii, 403
Early friends of Agriculture, ... vol. xi, 188
Eddy, Dyer & Co., horse power, ... vol. xiii, 102
Egg plant, account of, ... vol. viii, 370
Eggs, consumption of, ... vol. x, 547
Egyptian corn, ... vol. xv, 248

Digitized by Google

Eldridge, Ahira, on the Agriculture of Washington county, vol. i, 161
Elements of scientific Agriculture, Prof. Norton,....vol. ix, 602
of crops,.....vol. v, 48
Elgin, Lord, Governor Canada,.....vol. xi, 18
Elliot's designs for farm houses,.....vol. viii, 252
Elliot, on the fruits of Ohio,.....vol. viii, 358, vol. ix, 405
plan of barn,.....vol. xiii, 256
Ellis' design for farm houses,.....vol. vi, 122
Ellwanger & Barry, 35 new varieties pears,.....vol. xiii, 107
Emery & Co., drill,.....vol. xiii, 99
horse power,.....vol. xiii, 102
Emmons, E., analysis of milk,.....vol. x, 326
Encrinal limestone, Seneca,.....vol. x, 455
Endive, analysis of,.....vol. xii, 331
English Agriculture,.....vol. i, 183
Enos, Benjamin, Vice President,.....vol. iv, 33
farm book,.....vol. viii, 218
Entomology, Prof. Goadly,.....vol. xii, 252
Erie county, Agriculture of,.....vol. iii, 437
products of,.....vol. xii, 400
Essay, premiums offered for,.....vol. i, 76
on cattle,.....vol. i, 249
on cattle and sheep,.....vol. i, 271
charcoal,.....vol. i, 298
on Agriculture,.....vol. ii, 289
on Agricultural schools,.....vol. ii, 149
resolutions in relation to,.....vol. iii, 98
cattle from Scotland,.....vol. iii, 195
on cattle of improved breeds,.....vol. iii, 192
on apple culture and uses,.....vol. iv, 294
Canada thistle,.....vol. vi, 405, 429, vol. xiv, 681
on Jersey and Alderney cattle,.....vol. x, 317
on Agricultural dynamics,.....vol. x, 617
on Agriculture, by W. P. Prentice,.....vol. xiv, 165
cetonidæ,.....vol. ix, 736
Essay on diseases and insects injurious to wheat,.....vol. iii, 201
farm building, vol. ii, 121, vol. ii, 125, vol. ii, 130, vol. v, 230, vol. vi, 122, vol. viii, 252

Digitized by Google

Essay on farm management,.....vol. ii, 97, vol. 4, 76
fences,.....vol. i, 357
fruit garden,.....vol. i, 221
fruit,.....vol. vi, 535
geology,.....vol. i, 273
grape culture,.....vol. i, 388
grasses, by Sandford Howard,.....vol. xv, 237
hemp culture,.....vol. i, 358
Horses in winter,.....vol. i, 301
their best breeds,.....vol. i, 303
insects,.....vol. iii, 128, 201
introduction of new products,.....vol. iii, 175
irrigation,.....vol. v, 223
Italian wheat,.....vol. i, 360
madder culture,.....vol. iii, 186
manufacturing and wool growing interests,..vol. i, 393
manures,.....vol. ii, 65
mulberry culture,.....vol. i, 246
phosphate of lime,.....vol. xi, 306
pigeon weed,.....vol. vi, 435
plow,.....vol. iii, 626
potato rot,.....vol. v, 342, 349, vol. x, 329
poultry,.....vol. i, 362
rain, &c., by George Geddes,.....vol. xiv, 150
rotation of crops,.....vol. iv, 105, 118
rural life,.....vol. x, 578
science and agriculture,.....vol. v. 207, vol. ix, 602
sheep and their best breeds,.....vol. i, 304, 320, 328
Paular merino,.....vol. i, 339
management,,.....vol. i, 341
swine, breeds and raising,.....vol. i, 384
tillage,.....vol. i, 211, vol. viii, 342
wheat fly,.....vol. v, 255
wire fences,.....vol. x, 328
Essex county survey,.....vol. xii, 644
supplement to survey,.....vol. xiii, 699
European agriculture, state of,.....vol. ix, 24
Executive committee, the duties of,....vol. i, 9, 14, vol ix, 19
Expenses of farming,.....vol. x, 547

Digitized by Google

Expenses of various crops,.....vol. x, 550
Experimental crops,.....vol. vi. 2, vol. vii, 298, vol. viii, 297
encouraged,.....vol. x, 563
Extermination of weeds,.....vol. ii, 284, vol. xiii, 617
Fairs, permanent location, report,.....vol. xiii, 201, vol. xiv, 12
Fairbanks & Co., scales,.....vol. xiii, 98
Fallows,.....vol. iv, 118
Farm accounts,..... vol. viii, 191, 218, vol. xv, 160
Farmer's Club, Richmond,.....vol. x, 290
Farm animals,.....vol. vi, 577
buildings, vol. ii, 121, 125, 130, vol. v, 234, vol. vi, 122, vol. vii, 226, vol. viii, 252, vol. xi, 733
crops, form for statement of,.....vol, viii, 436
statement,.....vol. xiii, 280
management, vol. ii, 97, 289, vol. iii, 552, 545, vol. iv, 76, 438
statement of, vol. v, 166, vol. vi, 106, vol. vii, 193, 212, 219, vol. viii, 187
report and questions,.....vol. x, 167, 517
report,.....vol. xi, 209
requirements for premiums,.....vol. xi, 211
report of committee,.....vol. xiii, 221
statement by G. W. Coffin,.....vol. xiv, 102
statement by Wm. Johnson,.....vol. xiv, 121
management,.....vol. xiv, 88
Farms reported by counties, Jefferson county, vol. iv, 94, vol. viii, 473, vol. x, 240, vol. xiii, 459
Monroe,.....vol. iv, 96
Oneida,.....vol. iv, 101
Seneca,.....vol. vi, 627, vol. viii, 546
Wayne,.....vol. vi, 647, vol. ix, 571
Yates,.....vol. vi, 655
Chenango,.....vol. ix, 475
Erie,.....vol. ix, 488
Richmond,.....vol. x, 289
Herkimer,.....vol. xiii, 435
Onondaga,.....vol. xiii, 523
Farm, size of,.....vol. ii, 284
rules and regulations,.....vol. viii, 434

Digitized by Google

Farm, visit to G. Geddes,.....vol. i, 47
F. Woodward,.....vol. i, 46
Gen. Johnson,.....vol. iv, 428
Farms, State premiums, George Geddes,.....vol. v, 170, 179
Wm. Buel,.....vol. v, 170, 187
Wm. Garbut,.....vol. v, 170, 193
James Callanan,.....vol. vi, 111
James Van Sicklen,.....vol. vi, 118
J. Delafield,.....vol. vii, 83
statements,.....vol. vii, 200
Peter Crispel,.....vol. vii, 83
statement,.....vol. vii, 212
James Pendell,.....vol. vii, 83
statement,.....vol. vii, 219
H. T. E. Foster,.....vol. viii, 177
statement,.....vol. viii, 192
E. C. Bliss,.....vol. viii, 177
statement,.....vol. viii, 202
E. S. Salisbury,.....vol. ix, 332
statement,.....vol. ix, 333
Helim Sutton,.....vol. ix, 332
statement,.....vol. ix, 343
Roswell Harmon,.....vol. x, 169
D. D. T. Moore,.....vol. x, 178, vol. xi, 4
E. M. Bradley,.....vol. x, 190
A. G. Ford,.....vol. xi, 237
N. & E. S. Hayward,.....vol. xi, 215
McCulloch & Kirtland,.....vol. viii, 210, vol. xi, 230
Leonard Clift,.....vol. xv, 129
James McLallen's,.....vol. xv, 135
Farms, county premiums, Jona. Battey, Clinton,.....vol. ii, 314
Lewis Sherrill, Greene,.....vol. ii, 341
Peter Roggen, Greene,.....vol. ii, 341, vol. iii, 514
E. Marks, Onondaga,.....vol. ii, 369
E. D. Cobb, Onondaga,.....vol. ii, 369
H. Avery, Onondaga,.....vol. ii, 369
S. Severance, Oswego,.....vol. ii, 375
I. W. Lyons, Oswego,.....vol. ii, 377
I. Akins, Rensselaer,.....vol. ii, 387

Digitized by Google

Farms, county prem's, I. D. Vanderheyden, Rensselaer, vol. ii, 387
Daniel Fish, Rensselaer,.....vol. ii, 387
I. T. Everests, Clinton,.....vol. iii, 483
W. P. Capron, Wayne,.....vol. iii, 501
Thomas Barnes, Wayne,.....vol. iii, 501
E. L. Chadwick, Wayne,.....vol. iii, 501
E. T. Aldrich, Wayne,.....vol. iii, 501
S. E. Hudson, Wayne,.....vol. iii, 501
C. S. Button, Wayne,.....vol. iii, 501
D. & G. W. Kenyon, Wayne, ...vol. iii, 501
I I. Cobb,.....vol. iii, 501
A. Van Bergen, Greene,.....vol. iii, 514
H. P. Strunk, Rensselaer,.....vol. iii, 522
I. Tallmadge,.....vol. iii, 522
Lewis Baffet, Rensselaer,.....vol. iii, 522
Peter Stover, Rensselaer,.....vol. iii, 522
Nathan Brownell, Rensselaer,.....vol. iii, 522
J. Y. Kipp, Rensselaer,.....vol. iii, 522
I. W. Craner, Rensselaer,.....vol. iii, 524
Lewis Cole, Rensselaer,.....vol. iii, 524
John L. Cole,.....vol. iii, 524
H. T. Avery, Onondaga,.....vol. iii, 544
S. Cheseborough, Onondaga,.....vol. iii, 544
E. D. Cobb, Onondaga,.....vol. iii, 544
C. H. Kingsley, Onondaga,.....vol. iii, 544
W. G. Van Vechten, Onondaga,.....vol. iii, 544
Levi Colvin, Cayuga,.....vol. iii, 565
Roswell Curtis, Cayuga,.....vol. iii, 564
J. F. Osborne, Cayuga,.....vol. iii, 563
J. E. Miles, Jefferson,.....vol. iii, 392
George Webb, Jefferson,.....vol. iii, 592
Wm. Scott, Jefferson, ...vol. iii, 592
A. Coolige, Jefferson,.....vol. iii, 592
John Loring, Washington,.....vol. iii, 609
Thompson Lincoln, Washington,.....vol. iii, 610
I. Reed, Washington,.....vol. iii, 610
Wm. Ames, Oswego,.....vol. iii, 638
John Sandford, Oswego,.....vol. iii, 638
John Tiffany, Oswego, ...vol. iii, 638

Digitized by Google

Farms, county premiums, S. N. Brown, Onondaga,..vol. vi, 583
Wm. Plumb, Onondaga,.....vol. vi, 583
H. Avery, Onondaga, ...vol. vi, 581
J. Y. Kipp, Rensselaer,.....vol. vi, 612
W. Warner, Rensselaer, ...vol. vi, 612
James Grant, Rensselaer,.....vol. vi, 612
J. Hastings, Rensselaer,.....vol. vi, 613
L. D. Eddy, Rensselaer,..... .....vol. vi, 613
J. Delafield, Seneca,.....vol. vi, 624
J. T. Hubbard, Seneca,.....vol. vi, 624
John Mallory, Yates, ...vol. vii, 785
Charles Wilcox, Jefferson,.....vol. viii, 475
Mrs. S. Stevens, Jefferson,.....vol. viii, 475
E. W. Whiteford, Jefferson, ...vol. viii, 475
H. T. E. Foster, Seneca,.....vol. viii, 551
J. Wykoff, Seneca,.....vol. viii, 551
Helim Sutton, Seneca,.....vol. viii, 551
A. Baldwin, Yates, ...vol. viii, 591
George Juliand, Chenango,.....vol. ix, 475
Joseph Watson, Wayne, ...vol. ix, 572
O. Bartholomew, Jefferson, ...vol. x, 244
O. Cooley, Jefferson,.....vol. x, 244
Farm husbandry, prize essay, ...vol. xv, 263
report, ...vol. xv, 121
Farms, dairy, A. L. Fish, ...vol. iv, 222
James Van Sicklen, statement, ...vol. vi, 118
H. G. Foote,.....vol. xiii, 616-622, 223
account of by James Callanan,.....vol. vi, 118
Abraham Carl,.....vol. xiii, 674
Streeter's, ...vol. xiii, 676
Joseph Watson,.....vol. xiii, 680
Job Travis,.....vol. xiii, 677
of Cortland county,.....vol. xiii, 400
Royal A. Andrews,.....vol. xv, 61
Charles Jones,.....vol. xv, 126
E. M. Bradley,.....vol. xv, 609
Wm. Johnson,.....vol. xv, 611
Elijah Cheeseboro, ...vol. xv, 569

Digitized by Google

Farms, dairy, report of committee, with statements of E. S. Salisbury and Helim Sutton,....vol. ix, 332, 350
Farmers' conferences,.....vol. vi, 583, vol. vii, 690
rights and duties,.....vol. iii, 411
home,.....vol. xiii, 457
Farming, by G. H. Barstow,.....vol. x, 302
cheap farming condemned, ...vol. x, 499
expenses,.....vol. x, 547
remarks on,.....vol. xiii, 418
theory and practice, ...vol. xiii, 457
in Great Britain, ...vol. xiv, 71, 74
Fat cattle and fattening,.....vol. vii, 115, vol. viii, 127, 667
W. Wilcox, ...vol. ix, 476, vol. x, 37
Faxton, T. S., remarks,.....vol. xv, 119
Fences,.....vol. i, 357
cost of,.....vol. xv, 159
of wire, ...vol. x, 328
Fish manures, ...vol. ix, 671
Fish, Alonzo L., report dairies, Herkimer county,...vol. xi, 515
experiment in manufacturing cheese and cheese dairies,.....vol. vii, 262
remarks on farming.....vol. xiii, 418
Fish, catalogue of, in New-York harbor, ...vol. iii, 454
Fitch, Dr. Asa, on survey,.....vol. vii, 38
on the wheat fly, ...vol. v, 255
Hessian fly, ...vol. vi, 316
report on insects,..vol. xiv, 691–880, vol. xv, 409–555
on agricultural college, ...vol. xii, 621
apple tree pests, (essay,).....vol. xiii, 178
Flax, culture and expense, vol. v, 338,498, vol. vi, 160, 619, vol. vii, 296, vol. viii, 323, vol. ix, 391
and cotton, report on, ...vol. xi, 104
substitute for cotton,.....vol. xi, 208
cultivation, ...vol. xi, 284
lecture on, by Prof. Wilson, its cultivation, uses, &c., vol. xiii, 39–68
culture, ...vol. xiii, 311
machinery for preparing, ...vol. xiii, 313
manures for,.....vol. xiii, 312

Digitized by Google

Flax, winter, Falkersaborf, Russia,.....vol. xiii, 176
Flint, Charles L., essay on Indian corn,.....vol. ix, 281
Flour, machine to prepare grain for, ...vol. vii, 190
yield of, from bushel wheat,.....vol. ix, 561
Fly or bots, ...vol. iii, 165
Foster, Jessup & Co., grain drill,.....vol. xiii, 100
Foreign stock, (see cattle,).....vol. vi, 104
Form of agreement with laborers,.....vol. viii, 433
Foddering stock,.....vol. xiv, 119
Foster, H. T. E., his farm described,..vol. viii, 187, vol. x, 517
Food for stock, by E. N. Horsford,.....vol. iv, 210
Food of plants,.....vol. vii, 518
Foot, H. G., farm statement and draining,.....vol. xiii, 616
Foot rot in sheep and cattle, how cured,.....vol. xiv, 430
Fountain, T., on the Agriculture of Westchester co...vol. ii, 217
Frost, E. C., on the Agriculture of Chemung county, vol. ii, 143
Vice President,.....vol. vi, 18, vol. ix, 1
report, Chemung,.....vol. x, 211
French Merino sheep,.....vol. xi, 404
Fruit, apples,.....vol. iv, 294
trees,.....vol. iv, 312
committee to examine, ...vol. v, 29
report,.....vol. vi, 19
approved varieties,.....vol. viii, 277
and fruit culture,.....vol. ix, 594, vol. ix, 350
analysis of,.....vol. ix, 737
winter meeting,.....vol. xiii, 315
list of,.....vol. xiii, 54
Miller's seedling,.....vol. xiv, 56
committee's report, vol. ii, 45, vol. vi, 81, 19, 179, vol. vii, 58, 100, 170, 315, vol. viii, 275, vol. ix, 116, 350
culture in Ohio,.....vol. viii, 358, vol. ix, 405, 594
description of,.....vol. ii, 269, vol. xiv, 408
discussions on,.....vol. vi, 512, vol. vii, 553, 561
essay on,.....vol. vi, 535
garden, essay on,.....vol. i, 221
in Chemung county,.....vol. vii, 594
Clinton county,.....vol. vii, 599

Digitized by Google

Fruit, Jefferson county, ... vol. vii, 661
Oneida county, ... vol. vii, 412
Pomological convention, ... vol. viii, 15
prepared specimens, Glover's, ... vol. xi, 177
Fruit trees, insects injurious to, ... vol. iii, 152
management, ... vol. iv, 312, vol. vi, 81, vol. xiv, 116
Fruit, report of committee, ... vol. xiv, 139
report by Dr. H. Wendell, .. vol. viii, 275, vol. ix, 350
Fruit trees and fruits of America, ... vol. vii, 102
fruit and fruit growing, Herkimer, ... vol. xii, 417
Fruit orchards and gardens, ... vol. xv, 587
Fruit, varieties recommended, ... vol. viii, 20, vol. ix, 350
reports, ... vol. xii, 76, 80, 222
Fruits of America, (Hovey), ... vol. viii, 136
Berkshire, by W. Bacon, ... vol. xiv, 140
Fruit, reported by counties, Herkimer, ... vol. xiii, 436
Jefferson, ... vol. xiii, 469
Oneida, ... vol. xiii, 506
Franklin county, report on farms, ... vol. xiv, 452
crops, ... vol. xiv, 461
Fuller, Wm., Vice President, ... vol. viii, 137
report on Agriculture, ... vol. i, 1

G.

Garbut, Wm., his farm, ... vol. v, 170, 193
Garden, insects, injurious to, ... vol. iii, 132
Gardner, D. P., on special manures, ... vol. vi, 209
Howell, on the agriculture of Saratoga county, vol. i, 159
Garnett, James M., on the agriculture of Virginia, ... vol. i, 171
Gay, A. W., & Co., on pumps, ... vol. xiii, 95
Gas works of Buffalo, report on, ... vol. viii, 124
Gavit, J. E., on the corn or grain weevil, ... vol. viii, 656
Gaylord, W., Vice President, ... vol. i, 10
geology, ... vol. i, 273
tillage, ... vol. i, 211
on the agriculture of Onondaga, ... vol. ii, 174
farm management, ... vol. ii, 97
manures, ... vol. ii, 65
insects, ... vol. iii, 127
analysis of soils, ... vol. iv, 61

Digitized by Google

Gaylord, W., rotation of crops, ... vol. iv, 119
his death and tribute, ... vol. iv, 61
Geddes, George, visit to farm, ... vol. i, 47
farm described, ... vol. iii, 545
harrow improved, ... vol. iii, 550
experiments with Indian corn, ... vol. iv, 168
premium farm, ... vol. v, 170
statement of farm, ... vol. v, 179
experiments with corn, ... vol. v, 297
on plank roads, ... vol. vi, 244
essay on rain, &c., ... vol. xiv, 150
Genesee, agriculture of, ... vol. ii, 162, vol. xi, 511
Geological survey of the State, ... vol. iii, 241
Geology, advantages to agriculture, vol. viii, 362, vol. ix, 176, 728
mom of New-York, ... vol. iii, 241
and mineralogy, ... vol. ix, 176
Glover, Townend, prepared fruits, ... vol. xi, 177
Goat, by W. C. Watson, ... vol. xv, 390, 393
Goady, Prof., on entomology, ... vol. xii, 252
Goodrich, C., on the Agriculture of Vermont, ... vol. viii, 380
Goodrich, C. E., on the potato disease, vol. vii, 425, vol. viii, 403, vol. x, 719
on potato, ... vol. xi, 365 to 400
Gould, J. Stanton, report Rhode Island fair, ... vol. xii, 349
Gooseberry, analysis of, ... vol. ix, 743
varieties of, ... vol. ix, 369
Goshen butter, how made, ... vol. xi, 532
Grade cattle, ... vol. v, 79, vol. vi, 73
Grain, analysis of, ... vol. x, 616
time of maturing, ... vol. xiv, 96
mill iron, ... vol. vii, 405
seeds, ... vol. xi, 98, 287
statements of, ... vol. xii, 215, 18
drill, Bickford & Huffman, ... vol. xiii, 100
Foster, Jessup &.Co., ... vol. xiii, 100
Seymour & Co., ... vol. xiii, 100
Grapes, culture of, ... vol. i, 388, vol. v, 502, vol. vi, 686
approved varieties, ... vol. vii, 352
culture, ... vol. viii, 365

Digitized by Google

Grapes, mildew how cured, by A. Marks,.....vol. ix, 596
how preserved, by James Lennon,.....vol. ix, 594
culture,.....vol. xiv, 25, 148
Diana grape,.....vol. xiv, 25
Grass cloth of China,.....vol. ix, 384
Grass seed, by Abram Carl,.....vol. xiii, 674
Grass lands,.....vol. xiv, 111
culture of,.....vol. xv, 180
statistics of,.....vol. vii, 641
Graves, Hon. E., on Agricultural science,.....vol. x, 237
Greig, John, on education,.....vol. iv, 372
Grove, H. D., on sheep,.....vol. i, 328
Grove, John V., premium farm,.....vol. xv, 122, 131
Grub worm,.....vol. iii, 151
Guano, chemical report on,.....vol. vi, 312
compared with manure,.....vol. v, 215
Guano,.....vol. ix, 669
its effects on wheat crop,.....vol. x, 291
experiments with,.....vol. xiv, 105
Gypsum, a fertilizer,.....vol. iv, 205

H.

Haldeman, S. S., on the raspberry insect,.....vol. vi, 374
Hall, James, geology of New-York,.....vol. iii, 241
geological map,.....vol. v, 30
Halliday's windmill,.....vol. xiv, 49
Hannam, I., on the agriculture of England,.....vol. i, 183
honorary member,.....vol. i, 22
Harmon, R., on the varieties of wheat,.....vol. ii, 254
Harmon, Rawson, on wheat,.....vol. iii, 217
Vice President,.....vol. iii, 1
prize medal, World's Fair,.....vol. xi, 144
Harris, Dr. Wm., on insects,.....vol. xiii, 188
Palmer worm,.....vol. xiii, 190
Harris, Joseph, (prize essay,) superphosphate lime,..vol. xi, 306
Harrow improvement, by G. Geddes,.....vol. iii, 550
Hathaway, J., on the culture of Italian wheat,.....vol. i, 360
Hayward, N. and E. S., on carrot culture,.....vol. xiii, 294
Hay making,.....vol. v, 412, vol. viii, 195, 205, vii, 496
Monroe county,.....vol. xiii, 490

Digitized by Google

Hay making, H. G. Foote, ... vol. xiii, 618
R. Bennett, ... vol. xiii, 625
mode of curing, ... vol. xv, 181
press, Dering and Dederick, ... vol. xiii, 97
Emery & Co., ... vol. xiii, 97
Hedges of thorn, by M. B. Bateham, ... vol. iv, 416
Herkimer, the agriculture of, ... vol. i, 135
dairies, &c., ... vol. xi, 515
Hemp culture, ... vol. i, 358
Hepburn, I. H., on charcoal, ... vol. i, 298
on best breeds of cattle, ... vol. ii, 257
Hereford cattle, value of in England, 1841, ... vol. i, 197
report on, ... vol. v, 77, vol. vi, 51, vol. xii, 141
points of excellence, ... vol. xiii, 81
Hessian fly, account of, ... vol. vi, 316, vol. xiv, 526
Hess, R. W., statement of barley culture, ... vol. xiii, 285
Hickox, H., Executive committee, 1832, ... vol. i, 5
Hitchcock, N., Jr., butter, ... vol. xi, 270
Hitchcock & McMaster's scales, ... vol. xi, 121
History and Agriculture of Queens county, ... vol. viii, 524
Higgins, Prof., on Agricultural education, ... vol. ix, 92
Hives for bees, ... vol. viii, 95
Hog pen, a plan of, ... vol. vii, 229
Holkam, on Irrigation, ... vol. ii, 285
Holbert, I., his dairy, ... vol. viii, 269
Holbert, J. S., his dairy, ... vol. xv, 569
Hollister, A., on the Agriculture of Cayuga county, .. vol. ii, 139
Holmes, W. M., premium farm, ... vol. xv, 128
Home department, memorial, ... vol. viii, 182
Hopkins, Ira, on the Agriculture of Cayuga county, .. vol. i, 129
Hopkins, H. H., on farms, breeding, &c., ... vol. ii, 284
Hops, culture of, ... vol. iv, 447, vol. v, 497
statement of crops, ... vol. xiii, 549
Horses, care of in winter, ... vol. i, 301
best breeds, ... vol. i, 303
Fly or bots, ... vol. iii, 165
varieties of, ... vol. iv, 284
blood, ... vol. v, 504, vol. vii, 120
account of, ... vol. vi, 680

Digitized by Google

Horses, different breeds, management and diseases of, by W. C. Watson,.....vol. xv, 317 to 334
Horse powers,.....vol. xii, 132
Badger's, Westinghouse's, T. Sharp's, Eddy, Dyer & Co's., (Taplin's), Emery & Co's., vol. xiii, 102, 3
Horticulture,.....vol. i, 7
implements of,.....vol. ii, 37
in western New-York,.....vol. iii, 467
in Onondaga,.....vol. vi, 577
in Champlain Valley,.....vol. xiv, 407
Horsford, E. N., on food for stock,.....vol. iv, 210
Hotchkiss, Wm., premium World's Fair,.....vol. xi, 146
Hough, F. B., grape culture, 1664,.....vol. xiv, 148
essay on climate,.....vol. xv, 189
Howard, Sandford, on Highland cattle,.....vol. iii, 195
Galloway cattle,.....vol. vi, 284
Ayrshire,.....vol. xi, 407
breeding animals,.....vol. xii, 297
report on Devons,.....vol. xiii, 87
essay on grasses,.....vol. xv, 237
Howard, Mrs. S., design for buildings,.....vol. vii, 227
Howard, T. A., on the Agriculture of Indiana,.....vol. iv, 358
Howell, R., on the Agriculture of Tioga county,.....vol. ix, 435
crops of,.....vol. xv, 649
Hungerford, O., Vice President,.....vol. i, 76
Husbandry, essay on,.....vol. xv, 263
Hussey's reaping machine,.....vol. xii, 115, vol. ix, 554
Hyatt, J., on lime and marl,.....vol. viii, 386
Hydraulic ram,.....vol. vii, 181

I.

Illinois, the agriculture of,.....vol. iv, 360
Implements of America in England,.....vol. vii, 707
for draining,.....vol. viii, 235
Implements and machinery, report of committee, 1842, vol. ii, 30; 1843, vol. iii, 42; 1846, vol. vi, 70; 1847, vol. vii, 144; 1848, vol. viii, 86; 1849, vol. 9, 97; 1850, vol. x, 48 744; 1852, vol. xii, 152
Implements, trial at Geneva, 1852,.....vol. xii, 95
report of J. Edgecomb,.....vol. xi, 80, vol. xii, 353

Digitized by Google

Importance of organization of State and county Societies, vol. iii, 473
Imported cattle, vol. iii, 192, vol. ix, 460
Improved churn, by Jona. Battey, vol. iv, 232
Indiana, the agriculture of, vol. ii, 221, vol. iv, 358
Indian corn, culture, vol. ii, 58, 357, 392
experiments of culture, vol. iii, 506
culture in Cayuga county, vol. iii, 565
Dutchess, vol. iii, 618, vol. x, 221
Onondaga, vol. iv, 168
Cayuga, vol. iv, 173
Niagara, vol. iv, 176
Orange, vol. iv, 177
George Vail, experiments, vol. v, 296
report on and cost, vol. vi, 161
crops of, vol. vi, 673
experiments with, vol. vi, 167
culture in Oswego, vol. vi, 602
its cost, vol. vii, 287, 754
report on, P. Crispel, Jr., vol. viii, 313
history and analysis of, by J. H. Salisbury, vol. viii, 677
diseases of, vol. viii, 842
essay on, by C. L. Flint, vol. ix, 280
E. R. Dix, vol. ix, 320
P. Crispel, Jr., vol. ix, 322
E. S. Hayward, vol. xiii, 288
Ira Apthorp, vol. xiii, 290
Abram Carl, vol. xiii, 676
George Eells, vol. xiii, 291
Oneida, vol. xiii, 506
Onondaga, vol. xiii, 544, 52
Queens, vol. xiii, 584
history, by C. N. Bement, vol. xiii, 331–353
method treatment, vol. xiv, 91, 107
Industrial exhibition, London, vol. x, 6
Insects, essay on, vol. iii, 128
injurious to swine, vol. iii, 170
to vegetation, vol. iii, 132, vol. xi, 741
to wheat, vol. iii, 201

Digitized by Google

Insects, injurious to sheep, ... vol. iii, 167
wheat midge, ... vol. v, 255, vol. xiii, 555
Hessian fly, ... vol. vi, 316
raspberry bug, ... vol. vi, 37
grain weevil, ... vol. viii, 656
cetonidæ, ... vol. ix, 736
from Algiers, ... vol. xiii, 369
description, by Dr. Fitch, ... vol. xiii, 373
apple tree pests, ... vol. xiii, 178
report, by Dr. Fitch, ..vol. xiv, 691 to 880, vol. xv, 409
by Dr. Wm. Harris, ... vol. xiii, 188
Instruments of music, by A. B. Conger, ... vol. xi, 134
International exchanges, ... vol. viii, 13
Irrigation, ... vol. ii, 285
essay on, vol. v, 223, vol. vii, 366, vol. xiii, 214, vol. xiv, 8, 112, vol. xv, 183, 259
Ives, Jesse, on the Agriculture of Cortland county, ...vol. i, 131

J.

Jarvis, Wm., on sheep, ... vol. i, 320
Jefferson county, Agriculture of, ... vol. xiii, 467
report on farms, ..vol. iv, 94, vol. iii, 592, vol. viii, 475
statistics, ...vol. viii, 473, vol. xi, 533, vol. x, 240
productions, ... vol. xii, 423
farms, dairies, &c., ... vol. xiii, 459
cheese and butter dairies, ..vol. xiv, 473, vol. xv, 590
crops, ... vol. xiv, 484
Jewett, Sol. W., on Paular merino sheep, ... vol. i, 339
sheep breeding, ... vol. ii, 273
on the Agriculture of Addison county, Vt., vol. iv, 362
Jones, Hon. Pomeroy, on the Agriculture of Oneida county, vol. iv, 367
Vice President, ... vol. v, 29
Johnson, Wm., farm, ... vol. xiv, 121
draining, ... vol. xv, 254
Johnson, Jeremiah, Vice President, ... vol. i, 10, 76
Johnson, B. P., Vice President, ... vol. i, 10
on swine, ... vol. i, 384
on the Agriculture of Oneida, ... vol. ii, 167
Agricultural interests ..... vol. iii, 391

Digitized by Google

Johnson, B. P., Corresponding Secretary, vol. iii, 95, vol. viii, 137, vol. ix, 1, vol. x, 113, vol. xi, 139, vol. xii, 171, vol. xiii, 193, vol. xiv, 59, vol. xv, 63
on improved breeds of cattle, vol. iii, 192
his report for 1844, vol. iv, 43
President, vol. iv, 33
address, vol. v, 31
Recording Secretary, vol. vi, 44
on dairies, cheese, &c., vol. vii, 247
on the dairy, vol. vii, 570
report of dairies, vol. viii, 256
on fruit, vol. ix, 594
report on dairies, vol. ix, 298
on agricultural education, vol. ix, 584
remarks before National Ag. Society, Paris, vol. xi, 6
on McCormick's reaper, vol. xi, 159
report on World's Fair, London, vol. xii, appendix.
report on Maryland fair, vol. xii, 345
Johnson, S. W., lecture, vol. xv, 73
Johnston, J. F. W., his lectures at Albany in 1849, vol. ix, 162
address at Syracuse, vol. ix, 24
Johnston, John, draining, Seneca, vol. xi, 250
draining, vol. xv, 257

K.

Ketchum, Wm., on the manure used on Long Island, vol. iii, 462
Ketchum's mowing machine, vol. xii, 106, vol. xiii, 94
Killam A., statement of raising potatoes from the ball, vol. ix, 329
King, John A., Vice President, vol. vi, 18
President, vol. viii, 137
history and agriculture of Queens county, vol. viii, 524
report on wine, vol. xi, 131
King, James G. donation of pigs, vol. i, 47
Kinne's, report to the Legislature on agriculture, vol. v. 64
Kirtland pear, account of, vol. ix, 404
Kirtland, B. B., World's Fair, medal, vol. xi, 146
Kinzer, W. P., on the agriculture of Pennsylvania, vol. i, 165
on gypsum, vol. iv, 205
Kossuth, Gov. L., vol. xi, 206

Digitized by Google

L.

Laboratory,.....vol. ix, 161
Laborers, agreements with,.....vol. viii, 433
Langworthy, L. B., Vice President, ...vol. i, 77, vol. ii, 5
on the grape,.....vol. i, 388
on plows and plowing,.....vol. iii, 626
on farms of Monroe county,.....vol. iv, 94
on waste of manures,.....vol. iv, 135
Langworthy, W. A., report on implements,.....vol. xi, 82
Lawrence, S., on the wool-growing interests,.....vol. i, 394
Lawrence, Mr., of Yates, on Agricultural education, vol. ix, 589
on deep plowing, sub-soiling and drilling, .vol. ix, 598
Leather trade, remarks on,.....vol. vi, 712
in Greene county,.....vol. vi, 554
Le Couteur, Col., culture parsnips,.....vol. xi, 360
Ledyard, Jona D., Vice President,.....vol. ii, 5
Lennon, James, on grapes,.....vol. ix, 594
Le Roy, Hon. D. C., death of,.....vol. xi, 101
Lee, Daniel, report on Agriculture, ...vol. iii, 1, vol. iv, 47
on science and Agriculture,.....vol. iii, 425
Recording Secretary,.....vol. iv, 33
on wheat and its culture,.....vol. iv, 151
on wool growing,.....vol. iv, 255
report as Secretary,.....vol. v, 46
on the philosophy of tillage,.....vol. viii, 342
on Agricultural schools,.....vol. ix, 81
on miscellaneous articles and payenizing timber, vol. xi, 128
Lee, Charles, on the Agriculture of Yates county,...vol. ix, 440
essay,.....vol. xiv, 683
Leland, Z. A., Vice President,.....vol. ii, 5
Lenox, James, Vice President, ..vol. ii, 5, vol. iii, 1, vol. iv, 33
Le Ray De Chaumont, President, 1832, ...vol. i, 5
Library, agricultural,.....vol. iii, 518
appropriation, ...vol. vii, 100
notice,.....vol. viii, 14
additions to,.....vol. viii, 1, vol. ix, 21
catalogue of, 1850,.....vol. ix, 23
appropriations,.....vol. ix, 144

Digitized by Google

Lime, its uses, ... vol. vi, 697
agricultural uses, ... vol. viii, 386
phosphate, prize essay, ... vol. xi, 306
and salt on wire worms, ... vol. xiv, 423
stone, analysis of, ... vol. x, 610
of Seneca county, ... vol. x, 455
Linn, A. L., member executive committee, ... vol. i, 11
Linen, American company, ... vol. xii, 92
Livingston, E. P., Vice President, 1832, ... vol. i, 5
Livingston county statistics, ... vol. ix, 416
schools in, ... vol. ix, 475
Long Island, manures used there, ... vol. iii, 462
Longworth, N., on the culture of the grape and strawberry, vol. viii, 365
Ludlow, W. B., on horses, ... vol. i, 308
Ludlow, R. H., Vice President, ... vol. v, 29
Lyman, I. H., on the agriculture of Erie county, ... vol. iii, 437
Lynch, Lieut., on the importation of cattle, ... vol. viii, 378

M.

Mack, Hon. E., his death, ... vol. ix, 11, 20
Macdonald, John, on sub-soil culture, ... vol. iv, 140
Vice President, ... vol. xiv, 65
Machinery, report on, vol. vi, 97, vol. ix, 97, vol. x, 23, vol. xi, 121, vol. xiii, 91
at State fair, ... vol. xv, 49
for preparing flax, ... vol. xiii, 312
McCulloch & Kirtland's farm, ... vol. viii, 210, vol. xi, 230
McCoun, W. T., Vice President, ... vol. vi, 18
McCormick's prize reaper, at London, ... vol. xi, 154
McLean, S., on sub-soiling, ... vol. v, 100
McLallen's premium farm, ... vol. xv, 125
McIntyre, J. McD., Ex. committee, ... vol. i, 11
Treasurer, ... vol. v, 29, vol. vi, 18, vol. viii, 137
Recording Secretary, ... vol. ix, 1
Madder, culture of, by M. B. Bateham, ... vol. iii, 186
Madison, Agriculture of, ... vol. i, 144
survey of, ... vol. xi, 658, 753
historic notice of, ... vol. xi, 764
crops, &c., ... vol. xi, 547

Digitized by Google

Madison, draining,.....vol. xi, 658
Maine, David, Vice President,.....vol. viii, 137
Malta, products of the island of,.....vol. iv, 325
Mangel wurtzel, culture, ..vol. ii, 305, vol. v, 327, vol. viii, 328
Manufacturing and wool-growing interests,.....vol. i, 393
Manures, essay on,.....vol. ii, 65
of Long Island,.....vol. iii, 462
remarks by Dr. Beekman,.....vol. iv, 127
essay on,.....vol. iv, 129
used near Albany,.....vol. iv, 133
waste of,.....vol. iv, 135
use and application of,.....vol. v, 420
special,.....vol. vi, 209
discussion on,..vol. vi, 496, vol. vii, 506, vol. viii, 673
preparation of,.....vol. vi, 583
bones used as,.....vol. vii, 369
Prof. Johnston's lecture,.....vol. ix, 244
necessary,.....vol. ix, 659
compared with guano,.....vol. v, 215
nature of barn yard,.....vol. vi, 212
vegetable matter in,.....vol. vi, 213
vegetable,.....vol. ix, 661
of domestic animals .....vol. ix, 667
their nature,.....vol. ix, 244
for turnips,.....vol. xi, 416
of fish,.....vol. ix, 671
flax,..... vol. xiii, 318, vol. xiv, 9, 90
special experiments with,.....vol. xiv, 11
how applied, vol. xiv, 5, 91, 104, vol. xv, 132, 140, 152, 153, 179
for wheat,.....vol. xv, 154
Maple sugar, report on,.....vol. ii, 44
making, vol. iv, 292, vol. v, 130, vol. vi, 78, vol. viii, 95
Marks, Hon. A., on grapes,.....vol. ix, 596
Marks, Enoch, on farm management,.....vol. iii, 552
Marl, its uses,.....vol. v, 512, vol. viii, 386
deposits,.....vol. ix, 412
in Herkimer county,.....vol. ix, 499

Digitized by Google

Marl, analysis of,.....vol. ix, 499, vol. x, 615, 611
theory of their formation,.....vol. xi, 762
Martin, Hon. F. S., on agricultural education, ...vol. ix, 588
Marvin, T. J., Vice President,.....vol. v. 29
Maryland, the agriculture of, ...vol. ii, 223
Massachusetts Society for the promotion of agriculture, vol. iv, 392
Maxwell & Bros., draining,.....vol. xv, 253
Meat, the curing of,.....vol. v, 513
McCormick's reaper,.....vol. x, 159
Meech, E., on wintering horses,.....vol. i, 303
Mellen, Thomas, on the agriculture of Madison county,.vol. i, 144
on winter killing wheat,.....vol. ii, 279
Melons, analysis of,.....vol. xii, 333, 7
Memorial to Congress for a Home Department,....vol. viii, 182
Merino and Saxon sheep,.....vol. i, 320, vol. iv, 251
Meteorology,.....vol. viii, 845, vol. ix, 198
Milch cows,.....vol. vii, 114
in Jefferson county,.....vol. ix, 506
Milk, analysis of,.....vol. x, 326
composition of,.....vol. ix, 706, 7
Mildew, the white,.....vol. i, 237
on grapes, ...vol. ix, 122
Miller, A. S., on the Agriculture of Illinois,.....vol. iv, 360
Miller, Hon. Samuel, report on peaches and plums,..vol. xi, 113
Miller, James O., seedling apple,.....vol. xiv, 56
Millet, culture of,.....vol. ii, 395
Mississippi, the Agriculture of,.....vol. iv, 349
Mitchell, D. G., on farm buildings,.....vol. ii, 125
Monroe, farm report,.....vol. iv, 96
Agriculture, by F. P. Root, .vol. xiii, 489, vol. xiv, 495
Monroe, James, Vice President,.....vol. viii, 137
Morrell, L. A., Vice President,.....vol. i, 10
on sheep, ...vol. i, 341
More, D. D. T., farm prem., ...vol. x, 178
Morris, Jacob, Vice President, ...vol. i, 5
Miss Margaretta, Hon. member,.....vol. i, 22
essay on Cetonidæ,.....vol. ix, 736
Lewis G., Vice President, ...vol. ix, 1
report on car wheels,.....vol. xi, 130

Digitized by Google

Morris, L. G., President, ... vol. xii, 174
Morse, H. S., on fences, ... vol. i, 357
J. B., potato experiment, ... vol. xiii, 303
Mount Airy school, ... vol. viii, 382
Mowry, Le Roy, Vice President, ... vol. viii, 137
Mowing machines, Ketchum's, ... vol. xii, 106, vol. xiii, 94
trial in Queens, ... vol. xv, 622
Muck and peat, ... vol. v, 426
Mulberry culture, ... vol. i, 246, vol. ii, 279
Murray, H., on Agricultural education, ... vol. xii, 496
Musical instruments, report on, ... vol. xi, 134

N.

Native cattle, report on, ... vol. v, 79, vol. vi, 54
National Agricultural Society, Paris, ... vol. x, 6
Navy butter, report, B. P. Johnson, ... vol. viii, 10
Neat cattle, ... vol. i, 249
Newcomb, William, experiments on potatoes, ... vol. ix, 331
New Agricultural products, ... vol. iii, 175
rooms, ... vol. xv, 5
New-York city and county, ... vol. iii, 656
New-York State Agricultural Society, organization and officers, ... vol. i, 5
circular issued, ... vol. i, 6
act of incorporation, ... vol. i, 8
officers for 1841, ... vol. i, 10
amended constitution, vol. i, 9, vol. iii, 102, vol. vi, 12
notice of amendment, ... vol. vi, 12, vol. vii, 56
new constitution, ... vol. viii, 1, vol. ix, 18
constitution amended, ... vol. x, 115
Niagara agricultural products, 1851, ... vol. xi, 557
crops, ... vol. xiii, 494, vol. xiv, 499
Niven, T. M., on farm buildings, ... vol. ii, 130
Norton, John P., on potato rot, ... vol. v, 349
on soils, ... vol. viii, 55
Elements of scientific agriculture, ... vol. ix, 602
agricultural schools, ... vol. ix, 70
Nott, Joel B., President, ... vol. i, 10
Vice President, ... vol. iii, 1
Corresponding Secretary, ... vol. v, 29

Digitized by Google

Nott, Joel B., Recording Secretary,.....vol. vi, 18
Nott, Dr. Eliphalet, ...vol. i, 39
Nurseries, Clinton county,.....vol. vii, 609

O.

Oats, culture, ...vol. ii, 61, 310, 359, vol. iii, 91
cost and culture, vol. iii, 487, vol. iv, 187, vol. v, 310, vol. vi, 154
in Oneida,.....vol. vii, 293
Onondaga .....vol. vii, 702, vol. xiii, 549
report on,.....vol. viii, 317
Poland, ...vol. xiv, 134
first premium crops, S. W. Weeks, Jefferson, ...vol. i, 71
S. Phelps, Cayuga, ...vol. ii, 58
S. Lawton, Dutchess,.....vol. iv, 32
N. S. Swift, Oneida,.....vol. vi, 25
E. M. Bradley, ...vol. viii, 178
Ohio Fruits, by F. R. Elliott,.....vol. viii, 358, vol. ix, 405
Oil of peppermint, Hotchkiss, ...vol. xi, 119
Okra, account of,.....vol. viii, 370
Oneida, the agriculture of,.....vol. ii, 167, 173, vol. iv, 367
report on farms,.....vol. iv, 101
crops in,.....vol. xi, 562, 3, vol. x, 263, vol. xiii, 506
products,.....vol. xiii, 519
orchard culture,.....vol. xiv, 503
Onions, culture of, ...vol. ii, 394, vol. iv, 453, vol. vi, 620
Onondaga, the Agriculture of,.....vol. ii, 174
Horticulture of,.....vol. vi, 577
sheep husbandry, ...vol. vi, 587, vol. vii, 689
characteristics of Agriculture,.....vol. x, 268
statistics of,.....vol. ix, 418
crops,.....vol. xiii, 549
Ontario, the Agriculture of,.....vol. i, 150, vol. xiii, 571
Agricultural statistics,.....vol. xiv, 530
Orange, Agricultural institute, ...vol. vi, 599
crops,.....vol. xiv, 540
O'Reilley, H. S., Recording Secretary,.....vol. iii, 1
Orleans, report on farms,.....vol. xi, 576
Osborn, W. D., experiments on wheat, ...vol. viii, 297
Osborn, J. F., experiments on Indian corn,.....vol. iv, 173

Digitized by Google

Osborn, A., on Agricultural education, ... vol. ix, 590
Osier willow, report on, ... vol. vii, 183
C. N. Bement, ... vol. xii, 315
Oswego, farm report, ... vol. iv, 103
Agriculture of, ... vol. vii, 721, vol. ix, 424
Ottley, W. P., farm statement, ... vol. xiv, 98
essay on draining, ... vol. xiv, 128
Otsego, products, ... vol. xi, 585, vol. xiv, 574
Oxen, the use of, ... vol. iv, 264
in Rensselaer county, ... vol. vi, 614
working, ... vol. vi, 521

P.

Paintings and drawings, ... vol. vi, 101, vol. vii, 177
Palmer worm, by Dr. Wm. Harris, ... vol. xiii, 190
Pardee, R. G., on the farms of Wayne county, ... vol. ix, 571
Parsnips, culture of, Col. Le Couteur, ... vol. xi, 360
analysis, ... vol. x, 347
Pattern farm, ... vol. iii, 102
Patterson, G. W., Vice President, ... vol. iv, 33
on deep plowing, ... vol. ix, 599
Payenizing timber, ... vol. xi, 124, 8
Peach culture, ... vol. v, 513
varieties approved, vol. vii, 345, vol. viii, 22, 290, vol. ix, 364
analysis of, ... vol. ix, 743
report on, ... vol. x, 90, vol. xiii, 113
worm, ... vol. i, 235
Pear culture, ... vol. v, 500
varieties approved, ..vol. vii, 317, vol. viii, 286, vol. ix, 356
analysis of, ... vol. ix, 743
the Kirtland, ... vol. ix, 404
report on, ... vol. x, 89, vol. xi, 108, 35
new varieties, ... vol. xiii, 107
Peas, culture of, vol. ii, 62, vol. iii, 90, vol. v, 334, vol. vi, 171, 643
E. S. Salisbury, ... vol. xi, 279
N. Hitchcock, Jr., ... vol. xiii, 292
J. W. Jolley, ... vol. xiii, 293
Monroe, ... vol. xiii, 490

Digitized by Google

Pea bug,.....vol. iii, 138
Peat and muck, origin of,.....vol. v, 426
swamps, draining,.....vol. ix, 574
Pell, Robert L., his farm, ...vol. iv, 438
on soiling cattle,.....vol. iv, 236, vol. vi, 293
Pendell, James, Genesee, his farm management, ...vol. vii, 219
Pennsylvania agriculture,.....vol. i, 165
Peppermint, oil of,.....vol. xi, 119
Perpetual leases, ...vol. vi, 43
Peters, T. C., Vice President,.....vol. i, 10
on the agriculture of Genesee, ...vol. ii, 162
rights and duties of farmers, ...vol. iii, 411
provision trade, ...vol. iv, 238
butter dairies, ...vol. vii, 273
Petrie, A., on the agriculture of Herkimer, ...vol. i, 135
Phelps, Oliver, Vice President,.....vol. ix, 1
Phillips, M. W., on the agriculture of Mississippi,...vol. iv, 349
Phosphate of lime,.....vol. xi, 8
prize essay, J. Harris,.....vol. xi, 304
Pigeon weed, essay on,.....vol. vi, 435
how destroyed,.....vol. xiv, 685
Piggery, plan of,.....vol. vii, 229
Platt, J. C., on fruit trees,.....vol. iv, 312
Plaster, experiment with,.....vol. xiv, 105
Platt, Z. C., Vice President, ...vol. ix, 1
Plank roads,.....vol. vi, 244
Plans for buildings, vol. ii, 121, 125, 130, vol. v, 234, vol. vi, 122, vol. vii, 226, vol. viii, 252
Plants, food for,.....vol. vii, 518
Pleasures of science,.....vol. iii, 425
Plow, a new,.....vol. i, 40
sub-soil,.....vol. ii, 238
report on,.....vol. iii, 60
trial of,.....vol. iii, 61
essay on,.....vol. iii, 626
trial of at Poughkeepsie,.....vol. iv, 147
at Utica,.....vol. v, 99
report on,.....vol. vi, 69
improvements, by A. B. Allen,.....vol. vi, 229

Digitized by Google

Plow, report on,.....vol. vii, 129
trial of,.....vol. ix, 556
at Saratoga,.....vol. xiii, 93
Plowing,.....vol. iii, 626
and spading,.....vol. iv, 426
sub-soil,.....vol. v, 100
how to work,.....vol. v, 520
report on,.....vol. vi, 70
discussion on,.....vol. vi, 449
in Onondaga, vol. vi, 578, vol. vii, 690, vol. viii, 498
report on,.....vol. vii, 132
sub-soil,.....vol. vii, 416
sub-soil and deep,.....vol. vii, 534
deep, advantages of,.....vol. v, 56
in Wyoming, ...vol. ix, 582
in fall,.....vol. ix, 582
deep and shallow, vol. ix, 597, vol. xiv, 100, vol. xv, 151
sod plowing, by Abraham Carl,.....vol. xiii, 674
Plums, approved varieties of, vol. vii, 336, vol. viii, 292, vol. ix, 363
report on,.....vol. ix, 403
Poinsett, J. R., on the Agriculture of South Carolina, vol. i, 164, vol. iv, 337
Pomological rules,.....vol. vii, 100
convention,.....vol. viii, 15
North America,.....vol. viii, 23, vol. ix, 397
Pork, cost to fatten, ...vol. xiv, 125
Portable steam engines for farmers,.....vol. ix, 506
Potato hooks, Partridge,.....vol. xiii, 102
Potato culture, vol. ii, 63, 394, vol. iii, 93, 517, vol. iv, 197, vol. v, 319
rot or disease, ...vol. v, 342, vol. x, 329, vol. xiii, 554
in Scotland,.....vol. v, 349, vol. vi, 620
disease,.....vol. vi, 667
report on,.....vol. vii, 175
culture,.....vol. vii, 304
analysis of,.....vol. vii, 70
disease investigated,.....vol. vii, 425
in Clinton, ...vol. vii, 606

Digitized by Google

Potato culture, in Jefferson,.....vol. vii, 659
report on,.....vol. viii, 325
disease,.....vol. viii, 403
culture,.....vol. viii, 407
seedling,.....vol. ix, 505
from the ball,.....vol. ix, 339
at Mount Airy,.....vol. ix, 735
method of cultivating,.....vol. ix, 518
experiments,.....vol. ix, 329, 331
report and statements,.....vol. x, 145
C. E. Goodrich's experiments,...vol. x, 719, vol. xi, 363
experiments in planting,.....vol. x, 291
experiments by H. H. Eastman, vol. xii, 221, 342, vol. xiii, 298
experiments, by J. B. Morse,.....vol. xiii, 303
Monroe,.....vol. xiii, 490
Onondaga,.....vol. xiii, 549
the sweet,.....vol. viii, 426
experiments by Volney Burgess,.....vol. xiii, 302
Poultry, essay on,.....vol. i, 362
report on,.....vol. iii, 501, vol. v, 94, vol. vi, 69
approved breeds,.....vol. ix, 749
report, by F. W. Collins,.....vol. xi, 76
Prentice, E. P., treasurer,.....vol. i, 11, 77, vol. ii, 5
Vice President, vol. iv, 33, vol. v, 29, vol. vi, 18, vol. viii, 137
President,.....vol. ix, 143
Prentice, W. P., prize essay,.....vol. xiv, 165
Premium crops, tabular statement,....vol. vi, 657, vol. vii, 798
Prize essays,.....vol. xiv, 140, 150, 165, 233
Presidents—Joel B. Nott, 1841,.....vol. i, 10
James S. Wadsworth, 1842,.....vol. ii, 5
James S. Wadsworth, 1843,.....vol. ii, 76
John P. Beekman, 1844,.....vol. iii, 100
B. P. Johnson, 1845,.....vol. iv, 83
J. M. Sherwood, 1846,.....vol. v, 29
George Vail, 1847,.....vol. vi, 18
Lewis F. Allen, 1848,.....vol. vii, 59
John A. King, 1849,.....vol. viii, 137

Digitized by Google

Presidents—E. P. Prentice, 1850,.....vol. ix, 143
John Delafield, 1851,.....vol. x, 113
Henry Wager, 1852,.....vol. xi, 139
Lewis G. Morris, 1853, ...vol. xii, 171
William Kelly, 1854,. .....vol. xiii, 193
Samuel Cheever, 1855, ...vol. xiv, 59
T. S. Faxton, 1856, ...vol. xv, 63
A. S. Upham, 1857, ...vol. xvi, —
Provision trade,.....vol. iv, 238
Products of State, 1845,.....vol. xi, 189
Public policy as to agricultural interests, ...vol. iii, 391
Pumpelly, Geo. J., Vice President,.....vol. i, 76, vol. iii, 100
Putnam, agriculture of, ...vol. i, 154

Q.

Queens, agriculture of, ... vol. i, 157, vol. ii, 186,vol. xi, 602
dairy statistics, ...vol. xiii, 581
butter, ...vol. xiii, 500
its history and agriculture,.....vol. viii, 523
Long Island thirty years ago,.....vol. xiii, 585

R.

Rabbits, by W. C. Watson, ... vol. xv, 396
Railroad freights,.....vol. vi, 13
compound rail for,.....vol. xi, 127
Rain, essay, George Geddes,.....vol. xiv, 150
mean depth,.....vol. xv, 208, 210, 213, 215
Randall, H. S., Corresponding Secretary, vol. i, 11, 77, vol. ii, 5
report,.....vol. i, 121, vol. ii, 137
on neat cattle,.....vol. i, 249
breeds of sheep, ...vol. i, 304
agriculture of Cortland,.....vol. ii, 151
on cattle and crossing,.....vol. ii, 265
organization of Societies,.....vol. iii, 473
Vice President,.....vol. iii, 1, vol. iv, 33
sheep management,.....vol. iv, 254
agriculture in schools,.....vol. iv, 388
Vice President, ...vol. v, 29, vol. vi, 18
on agricultural education, ...vol. ix, 585, 589
Randall, Geo., on Ayrshire cattle, ...vol. ii, 263
Randall, S. S., State statistics,.....vol. v, 380

Digitized by Google

Randall, J. L., on fine wool sheep, ... vol. viii, 247
Raspberry, insect, ... vol. vi, 374
varieties recommended, ... vol. ix, 371
Reaping machines, McCormick's, ... vol. x, 159, vol. xi, 85
Burrall's, ... vol. xii, 112
Danford & Co's, ... vol. xii, 113
J. H. Manny's, ... vol. xii, 113
Seymour & Morgan's, ... vol. xii, 113
Densmore's, ... vol. xii, 114
Hussey's, ... vol. xii, 115
at Saratoga, ... vol. xiii, 92
Atkins', self-raker, ... vol. xii, 112, vol. xiii, 92
Recording Secretary, duties of, ... vol. i, 9
P. S. Van Rensselaer, 1841, ... vol. i, 6
Luther Tucker, 1842, vol. i, 11; 1843, vol. ii, 5; 1845, vol. iv, 33; 1846, vol. v, 29, vol. vi, 18, 44, vol. xiv, 65
H. O'Reilly, 1844, ... vol. iii, 12
B. P. Johnson, 1847, ... vol. vi, 44; 1848, vol. vii, 59
J. McD. McIntyre, 1849, vol. viii, 137; 1850, vol. ix, 142; 1851, vol. x, 113
E. Corning, Jr., 1852, vol. xi, 9; 1853, vol. xii, 171; 1854, vol. xiii, 195; 1856, vol. xv, 69; 1857 vol. xvi,
Red root, how destroyed, ... vol. xiv, 685
Regulations for the fairs, see premium lists and annual meetings, for the first fair in 1841, ... vol. i, 27
Rensselaer, agriculture, ... vol. xiv, 605
Rhubarb, analysis of, ... vol. ix, 744
Rice plant, soil and analysis, ... vol. iv, 342
expense or cost of, ... vol. viii, 595
Richardson, H. D., on poultry, ... vol. ix, 749
Duane, premium farm, ... vol. xv, 586
Richmond, agriculture, ... vol. ii, 188, vol. iii, 454
system of farming, ... vol. x, 288
Riddle, S. S., on the sweet potato, ... vol. viii, 426
Rights and duties of farmers, ... vol. iii, 411
Roberts, Algernon S., on Geology, ... vol. viii, 362
Robinson, Solon, on the agriculture of Indiana, ... vol. ii, 221

Digitized by Google

Robinson, Solon, remarks, prize medal,.....vol. xi, 159
Rocks, analysis, by J. H. Salisbury,.....vol. x, 710
Rogers, H. W., Vice President,.....vol. viii, 137
Roots for stock, culture,.....vol. xiii, 622
Root culture,.....vol. i, 271, vol. ii, 277
in Clinton county,.....vol. iv, 194
its expenses, vol. v, 316, vol. vii, 303, vol. viii, 324, vol. ix, 329
by G. V. Sackett,.....vol. xiii, 318
Rose, Robert S., Vice President,.....vol. i, 1
Rotation of crops,.....vol. iv, 105, vol. iv, 118, vol. vii, 395
Russia, the Agriculture of,.....vol. viii, 638
Rust in wheat,.....vol. iii, 205
Rust, Philo, his ox,.....vol. ii, 265
Ruta baga, culture, vol. ii, 64, vol. iii, 91, vol. iv, 332, vol. vi, 607, 618, vol. vii, 307, vol. viii, 327
Rye, culture, vol. ii, 60, 393, vol. iii, 90, vol. v, 309, vol. vi, 618, vol. vii, 716, vol. viii, 317
winter, E. W. Bushnell,.....vol. xiii, 286
John Blauvelt,.....vol. xiii, 598
premium crops, J. T. Goodwin, Oneida,.....vol. ii, 57
Geo. McGeoch, Washington,.....vol. iii, 90
H. Converse,.....vol. xiv, 133

S.

Sackett, G. V., on root culture,.....vol. xiii, 318
Saline manure,.....vol. ix, 678
Salisbury, J. H., analysis, by,.....vol. viii, 371
Indian corn,.....vol. viii, 677
apple and rhubarb,.....vol. ix, 737
cherries, gooseberries, peaches and pears,..vol. ix, 743
Jerusalem artichoke,.....vol. x, 339
parsnips,.....vol. x, 347
vegetable oyster, carrot and beet,.....vol. x, 323–328
endive,.....vol. x, 331
celery, melon and cucumber,.....vol. x, 333–337
soils, rocks, &c.,.....vol. x, 710
Salisbury, E. S., report on farm,.....vol. ix, 332, 350
Salt, Onondaga,.....vol. vii, 277
analysis of,.....vol. vii, 279

Digitized by Google

Salt, manufacture of, ... vol. ix, 412, vol. xiii, 137
value of solar salt, Prof. G. W. Cook, ... vol. xii, 257
and lime and wire worms, ... vol. xiv, 423
Sandy soil for wheat, ... vol. vi, 251
prize essay, W. C. Watson, ... vol. xi, 340
Savage, John, Vice President, ... vol. i, 76, vol. iii, 1
Sawyer, James, on hemp, ... vol. i, 358
Schoharie, agriculture of, ... vol. ix, 433
Schuyler County Society organized, ... vol. xiv, 626
1855, ... vol. xv, 631
Science, its pleasures and profits, ... vol. iii, 425
ennobling results, ... vol. iii, 380
with agriculture, .. vol. v, 207, vol. viii, 138, vol. ix, 602
its need to the farmer, ... vol. vii, 62
as applied to agriculture, ... vol. xiii, 539
Scottish cattle, ... vol. iii, 195
Seneca county, agriculture of, ... vol. ii, 214
survey, by J. Delafield, ... vol. ix, 10, vol x, 350
crops, ... vol. x, 493, 560
Seasons, progress of, ... vol. xv, 200, 205
Saxton, A., on the agriculture of Schoharie co., ... vol. ix, 433
Seed corn, soaking abandoned, ... vol. xv, 158
planter, Wakefield's ..... vol. xiii, 100
Seymour & Co., grain drill, ... vol. xiii, 100
Seward, W. H., addresses, ... vol. ii, 7, vol. iii, 75
Sheep, Cotswold, ... vol. i, 55
remarks on, ... vol. i, 271
breeds of, ... vol. i, 304
Merino and Saxon, ... vol. i, 320, vol. iv, 251
breeding, ... vol. i, 328, vol. ii, 273
Paular Merino, ... vol. i, 339
management ..... vol. i, 341, vol. iv, 254
long-wooled, ... vol. ii, 27
profitable varieties, ... vol. ii, 277
insects injurious to, ... vol. iii, 167
wool growing, ... vol. iv, 255
Merino, care of, ... vol. vi, 280
husbandry in Onondaga, ... vol. vi, 587, vol. vii, 689
management and report, ... vol. vi, 684

Digitized by Google

Sheep, management,.....vol. vii, 311
husbandry,.....vol. vii, 537
report on profits,.....vol. vii, 549
remarks on,.....vol. viii, 236
and sheep husbandry,.....vol. ix, 53
French Merino,.....vol. xi, 404
statement of feeding,.....vol. xiii, 319
cross breed,.....vol. xiii, 90
foot rot, how cured,.....vol. xiv, 430
method of keeping,.....vol. xiv, 115
South Downs,.....vol. xiv, 116
Shepard, Charles U., on the rice plant,.....vol. iv, 343
Sherwood, J. M., Vice President,.....vol. i, 76, vol. ii, 5
President,.....vol. v, 29
address,.....vol. vi, 27
his cattle,.....vol. ix, 460
Short Horn bulls, report,.....vol. xiv, 31
cattle, points of excellence,...vol. xiii, 74, vol. x, 532
Silk, culture,.....vol. i, 240
report on,.....vol. ii, 37, 279
worms, feeding,.....vol. iii, 491
culture, reasons for,.....vol. iii, 528, vol. iv, 288
culture and manufacture, vol. v, 133, vol. vi, 80, 636, vol. vii, 407
convention,.....vol. iv, 463
Skinner, J. S., on oxen,.....vol. iv, 264
Simmonds, P. L., on Angola grass,.....vol. vi, 239
Slocum, J., on wheat in England,.....vol. viii, 339
Smith, G. B., on silk,.....vol. i, 240
Agriculture of Maryland,.....vol. ii, 223
Smith, Saxton, Vice President,.....vol. viii, 137
Smithsonian institute, proposal for appropriation,...vol. vii, 58
Snap dragon, how destroyed,.....vol. xiv, 112
Smut,.....vol. iii, 202
Sod plowing, by Abram Carl,.....vol. xiii, 674
Soils, management of,.....vol. ii, 243
clay, improvement of,.....vol. iii, 418
analysis of,.....vol. iv, 61, vol. viii, 496
structure and composition,.....vol. viii, 55

Digitized by Google

Soils, composition of,.....vol. ix, 212
of farms,.....vol. x, 613
analysis of English wheat soil,.....vol. i, 290
analysis of, by Dr. Salisbury,.....vol. x, 710
Soiling cattle,.....vol. iv, 236, vol. vi, 293, 693
Soule's wheat,.....vol. xiii, 677
South Carolina, Agriculture,.....vol. i, 164, vol. iv, 337
Speed, J. R., Vice President,.....vol. v, 29
death of,.....vol. xiii, 664
Spencer, Ambrose, Vice President,.....vol. i, 5
Springs, analysis of,.....vol. x, 473
Squash bug,.....vol. iii, 133
Statts H. T., on the agriculture of Dutchess,.....vol. i, 133
Stark, Charles M., on the pigeon weed,.....vol. vi, 435
State and county societies, their importance,.....vol. iii, 473
Statistics, agricultural, state,.....vol. v, 177, 380, vol. ix, 415
of Greene,.....vol. vii, 641
of Seneca,.....vol. viii, 557, vol. x, 550
of Delaware,.....vol. viii, 461
Oswego,.....vol. viii, 519, vol. ix, 424
Wayne,.....vol. viii, 584
Yates,.....vol. viii, 590, vol. ix, 440
Caledonia, Livingston,.....vol. ix, 416
Camillus, Onondaga,.....vol. ix, 418
Stafford, Onondaga,.....vol. ix, 419
Cicero, Onondaga,.....vol. ix, 422
Schoharie,.....vol. ix, 433
dairy, Wyoming,.....vol. ix, 581
Stebbins on the mulberry,.....vol. i, 246
St. Lawrence, agriculture of,.....vol. xiii, 600
farms and dairies,.....vol. xiii, 603
Stevens, Ambrose,.....vol. vi, 45
Canada thistle,.....vol. vi, 405
imported cattle,.....vol. ix, 460
Vice President,.....vol. ix, 143
Stock husbandry,.....vol. i, 6
report on,.....vol. ii, 26
food for,.....vol. iv, 210
foreign,.....vol. vi, 104

Digitized by Google

Stout, Z. B., on the agriculture of Ontario,.....vol. i, 150
Strawberry, approved varieties,.....vol. vii, 351
culture of,.....vol. viii, 365
Sub-soil plowing, vol. ii, 238, vol. iv, 140, vol. v, 100, vol. vii, 416–534
by Mr. Lawrence,.....vol. ix, 598
its effects,.....vol. xiv, 90, 103
plow,.....vol. xv, 139, 151
Sugar, from corn stalks,.....vol. iii, 232, vol. v, 130
from beet root,.....vol. xiii, 114
manufacture of,.....vol. xiii, 126
from Chinese sugar cane,.....vol. xv, 248
Superphosphate of lime, on potatoes, vol. xiii, 584, vol. xiv, 105
Survey of Washington,.....vol. vii, 35
Asa Fitch, on,.....vol. vii, 38
first part historical,.....vol. viii, 875
second part agricultural,.....vol. ix, 753
Seneca,.....vol. x, 350
Madison,.....vol. xi, 658
Essex,.....vol. xii, 650, vol. xiii, 699
Surgery, veterinary,.....vol. vi, 59
Sutton, Helim, farm,.....vol. ix, 322, 350
Swamps reclaimed,.....vol. xv, 254
Swamp muck,.....vol. v, 426
Swine, Berkshire,.....vol. i, 54, vol. ix, 489
breeding and raising,,.....vol. i, 384
report on,.....vol. ii, 30, vol. iv, 286
insects injurious to,.....vol. iii, 170
report humorous,.....vol. v, 90
feeding experiments,.....vol. vii, 419
fattening pigs,.....vol. xii, 224
different breeds, management and diseases of, by W. C. Watson,.....vol. xv, 298 to 315

T.

Temperature of State,.....vol. xv, 145, 202
Taylor Z., President of U. S.,.....vol. ix, 19
Thrashing machines,.....vol. ii, 30
Thomas, J. J., farm buildings,.....vol. ii, 121
description of fruit,.....vol. ii, 269

Digitized by Google

Thomas, J. J., new agricultural products, ... vol. iii, 175
diseases and insects of wheat, ... vol. iii, 201
agriculture of Wayne, ... vol. iii, 448
farm management, ... vol. iv, 476
rotation of crops, ... vol. iv, 105
apple culture and uses, ... vol. iv, 294
science and agriculture, ... vol. v, 207
experiments in cutting wheat at different periods, vol. ix, 318
agricultural dynamics, prize essay, ... vol. x, 617
Thomas, David, on the fruit garden, ... vol. i, 221
soils and management, ... vol. ii, 244
Thorn hedges, ... vol. iv, 316
Thorough-bred horses, by Wheeler, J. B., ... vol. xi, 63
Tillage, essay on, ... vol. i, 211, vol. viii, 342
Tile machine, ... vol. viii, 666
and pipe, ... vol. x, 521
Tioga, the agriculture of, ... vol. ix, 439
the town of Nichols, ... vol. ix, 435
crops, ... vol. xiii, 660, vol. xiv, 642, vol. xv, 649
Tobacco, analysis and manures for, ... vol. ix, 230
Todd, Sereno E., on the Canada thistle, ... vol. vi, 429
Tomato, analysis of, ... vol. viii, 370
Townsend, John, Vice President, ... vol. i, 5
Tompkins, the agriculture of, ... vol. iii, 443
crops, ... vol. xiv, 651
Travis, Job, farm, ... vol. xiii, 677
Trees and shrubs, ... vol. vi, 376
American, ... vol. vi, 390
European, ... vol. vi, 382
Treasurer, E. P. Prentice, 1841–42–43; Thomas Hillhouse, 1844, 1845; J. McD. McIntyre, 1846, 1847, 1848; Luther Tucker, 1849, 1850–1–2; B. B. Kirtland, 1853–4–5–6–7.
Trial of plows, 1843, vol. iii, 61; 1844, vol. iv, 147; 1845, vol. v, 99; 1850, vol. x, 48 to 69
Tucker, Luther, Recording Secretary, ... vol. i, 11, vol. ii, 5, vol. iv, 33, vol. v, 29, vol. vi, 18, 44, vol. xiv, 65
remarks on Fair of 1843, ... vol. iii, 435

Digitized by Google

Tucker, Luther, Treasurer, vol. viii, 137, vol. ix, 143, vol. x, 113, vol. xi, 140
Turnip, analysis of, ... vol. vii, 70

U.

Ulster, average of crops, ... vol. xiii, 667
crops, ... vol. xiv, 654

V.

Vail, George, President, ... vol. vi, 18
Vice President, ... vol. xii, 174, vol. xvi, —
Van Bergen, Anthony, Vice President, vol. i, 76, vol. ii, 5, vol. ix, 1
Van Ness, Nelson, Vice President, ... vol. ix, 1
Van Rensselaer, P. S., Vice President, ... vol. i, 5
Van Sicklen, J., his farm, ... vol. vi, 118
Vegetable manures, ... vol. ix, 661
oyster, analysis of, ... vol. x, 12, 323, 8
Vermont, the agriculture of Addison county, ... vol. iv, 362
agriculture of, ... vol. vii, 387
societies and agriculture, ... vol. viii, 380
Veterinary surgery, ... vol. vi, 59
Virginia agriculture, ... vol. i, 171
Visits to county societies, ... vol. vii, 51, 60

W.

Wadsworth, James S., President, ... vol. i, 76, vol. ii, 5
report from, ... vol. iii, 7
Wages of labor, ... vol. viii, 564
Walsh, Alexander, Vice President, ... vol. i, 11
essay on education, ... vol. ii, 289
his death, ... vol. ix, 11
Washburn, Calvin, on the agriculture of Oneida, ... vol. ii, 173
Washington, the agriculture of, ... vol. i, 161, vol. ii, 216
survey of, ... vol. vii, 35
1st part historical, ... vol. viii, 875
2d part geological and agricultural, ... vol. ix, 753
Wattles, S. L., farm statement, ... vol. xiii, 223
Water, its velocity in channels, ... vol. v, 232
composition of in Aberdeen, ... vol. vii, 366
effects of clearing up land, ... vol. xv, 231

Digitized by Google

Watson, H., on the agriculture of Hartford and Windsor counties, Connecticut, ... vol. iv, 364
Watson, Joseph, farm statement, ... vol. ix, 572
Watson, W. C., on Sandy soils for wheat, ... vol. xi, 340
on survey of Essex co., ... vol. xii, 650
supplement to survey of Essex county, ... vol. xiii, 699
essay on farm husbandry, vol. xiv, 233-356, vol. xv, 263, 396
Wayne, the agriculture of, ... vol. iii, 448
products, ... vol. xiii, 671
crops, ... vol. xiv, 660, 663
Weeds, extermination of, ... vol. ii, 284
Weekly winter meetings, ... vol. v, 43
Weeks, John M., on bees, ... vol. ii, 225
Weevil, account of, ... vol. viii, 656
Wendell, Dr. H., on fruits, ... vol. viii, 275
Westchester, the agriculture of, ... vol. ii, 217
Westfall's premium farm, ... vol. xv, 124
Wheat, culture of Italian, ... vol. i, 360
varieties of, ... vol. ii, 254, vol. iv, 159
winter killing, ... vol. ii, 279
culture, vol. ii, 393, vol. iii, 89, vol. viii, 645, vol. ix, 313, 597
insects, and diseases of, ... vol. iii, 140, 201
experiments, ... vol. iii, 217, vol. viii, 297, vol. ix, 314
cost of culture, ... vol. iii, 486, vol. v, 239
in Cayuga, ... vol. iii, 570
in southern tier of counties, ... vol. iv, 151
average crops, ... vol. iv, 154
analysis of, ... vol. iv, 151
observations of Dr. Beekman, ... vol. iv, 156
winter seed, ... vol. iv, 161
crops, and cost, ... vol. iv, 163
spring, and cost of, ... vol. iv, 165
fly, ... vol. v, 255, vol. x, 522
spring, ... vol. vi, 153, vol. ix, 317
on sandy soil, ... vol. vi, 251
in Ontario, ... vol. vi, 593, vol. viii, 509
Seneca, ... vol. vi, 631

Digitized by Google

Wheat, Tompkins, ... vol. vi, 641
Yates, ... vol. vii, 793
Oneida, ... vol. vii, 285, vol. xiii, 506
England, ... vol. viii, 339
and rye, ... vol. ix, 315
Black sea, spring, ... vol. ix, 484
drilling in, ... vol. x, 587
by Abraham Carl, ... vol. xiii, 674
Ellis Morse, yield, ... vol. xiii, 483
Chidham, account of, ... vol. xiii, 174
Wayne, ... vol. xiii, 671
and time to cut, ... vol. xiv, 91
cost, ... vol. xiv, 123
crop, ... vol. xv, 661
and wheat straw, analysis of, ... vol. vii, 70
first premium crops, G. Shaffer, ... vol. i, 70
N. S. Wright, Oneida, ... vol. iii, 89
M. Watson, Ontario, ... vol. iv, 32
E. J. Ayres, Tompkins, ... vol. iv, 43
E. Rivenburg, Oneida, ... vol. v, 239
T. Judson, Chautauque, ... vol. viii, 121
A. Miller, Oneida, ... vol. viii, 308
G. K. Eells, Oneida, ... vol. ix, 315
winter, J. M. Skinner, ... vol. xiv, 131
midge, its ravages, vol. xiv, 381, 407, 463, 492, 496, 500, 614, 653, 660, 680
fly, essay on, ... vol. v, 255
Wild carrots, how destroyed, ... vol. xiv, 113
Wilkinson, on culture of potatoes, ... vol. ix, 735
Wilson, Prof. J., on flax, ... vol. xiii, 39
on beet sugar, ... vol. xiii, 114
Winnebago, agriculture of, ... vol. iv, 360
Winds, direction and force, ... vol. xv, 223, 226
Windmill, Halliday's, ... vol. xiv, 49
Wire worm, ... vol. iii, 137
lime and salt on, ... vol. xiv, 423
Wire fence, ... vol. x, 328
J. Trever, ... vol. ix, 522

Digitized by Google

Winter meetings, 1842, vol. i, 63; 1843, vol. ii, 57; 1844, vol. iii, 87; 1845, vol. iv, 31; 1846, vol. v, 27; 1847, vol. vi, 11, vol. vii, 55; 1848, vol. viii, 135; 1849, vol. ix, 142; 1850, vol. x, 111; 1851, vol. xi, 139; 1852, vol. xii, 171; 1853, vol. xiii, 193; 1854, vol. xiv, 59; 1855, vol. xv, 63
Wine manufacture, ... vol. xiv, 148
Winter flax, ... vol. xiii, 176
Woodward, F., his farm, ... vol. i, 46
Wool Growers' Association of Western New-York, ... vol. xv, 675
Wool growing interests, ... vol. i, 393, vol. iv, 255
Saxon, ... vol. v, 88
letters on the trade, ... vol. vi, 284
preparation and sale of, ... vol. vii, 537
depot, origin of, ... vol. vii, 539
fine, report on, ... vol. viii, 236
statistics, ... vol. ix, 754, vol. xv, 664
Woolsey, E. J., on draining, ... vol. vii, 244
World's Fair at London, vol. ix, 144, vol. xi, appen'x, vol. xii, 179
Wright, Silas, his death, ... vol. vii, 32
correspondence with Mrs. W., ... vol. vii, 33
biography, ... vol. vii, 354
address, ... vol. vii, 16
Wright, J. A., address, ... vol. xv, 21
Wynkoop, A. J., on agricultural schools, ... vol. ii, 149
Wyoming, agriculture of, ... vol. vii, 777

Y.

Yates, farm report, ... vol. vii, 787, 791
products of, ... vol. viii, 590
agriculture of, ... vol. ix, 440
statistics of, ... vol. ix, 446
crops, ... vol. xiv, 679
Yam potato, ... vol. viii, 571
escapes disease, ... vol. ix, 563
Yellows, the, ... vol. i, 236

The foregoing index passed through the press at a time when sickness prevented a careful examination of it—and there are many deficiencies in it, which are very much to be regretted. It is hoped however, that defective as it is, it will, in some measure at least, accomplish the purpose designed in its preparation.

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DAIRY MANAGEMENT.

The continuation of the article of Mr. Thomas Horsfall, (ante p. 223–244,) from R. A. S. Journal, vol. 18, p. 131, on the management of the dairy for 1856–57, was not received in time to be inserted with the other. Its importance, however, requires its insertion in this volume, so that our dairymen and others interested in the matter will have the benefit of his valuable experiments before them. It will be seen that his cows were attacked with the pleuro-pneumonia, a disease which has been fatal in England and in Europe, and has prevailed to some extent in this country. The treatment by Mr. H., as given in his report, was successful in restoring the animals, but with more or less damage to the lungs; and it will be seen that the effect of this disease, even after the restoration of the animals, was marked in a diminished yield of milk. Every possible precaution should be observed in relation to this disease when prevalent, and an entire separation of the unaffected portion of the stock should immediately be secured.

The experiments testing the value of materials used as food for cattle, to convert it into food fitted for the use of man, represents a value thirteen to fourteen times greater than it would as manure, showing how important it is for the farmer to use as much as possible his produce as food for cattle, with a view of converting it into food for man; and thus, in the language of Mr. H., "*increase rather than enrich his manure heap.*"

The careful experiments made in fattening animals are worthy of careful attention, showing the quantity of food necessary to secure a given amount of beef. The efficacy of sugar and starch in the production of fat is fully discussed.

Some very carefully conducted experiments are given, showing that "the quantity and quality of butter depend essentially on

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the food and treatment; and that by suitable means you can produce as *much and as rich butter in winter as in summer.*" This is a very important consideration, deserving the careful examination of every dairyman interested in the production of butter.

The treatment of grass lands, the time of cutting and securing the hay, are fully described; and some very important facts are developed by the manner in which Mr. H. conducts his operations, both on his meadows and his permanent pastures.

Directions are given as to cows liable to the milk fever, a disease not unfrequent among cows in good condition, and which often proves fatal.

We consider the whole of the annexed article one deserving the careful study of all of our farmers interested in the dairy business, or who are fattening cattle for market. It aims to give the actual cost of all the operations—a matter of vital interest to every one to know—as upon the side on which the balance is found depends entirely the failure or success of the business.

While in some respects the treatment of Mr. H. may be more specially beneficial in Great Britain, still the principles elucidated and established are of general application, and cannot prove otherwise than useful, wherever the dairy is an object of interest, as in this country.

Mr. Horsfall—"Towards the close of July, 1856, and during the warm weather of August, my cows, whilst in pasture by day and housed during the night, were attacked by that unwelcome visitor the pleuro-pneumonia, which affected the majority of them, and continued with little intermission till the close of December. Though by treatment which I purpose to describe, nearly all have been restored, yet it is not without more or less damage to the lung—an organ essential to the due performance of every function of the animal, and exercising especial influence on the respiratory process, and the carbonaceous or fatty products.

"In the course of my experience, I have ascertained that cattle, whose lungs have been damaged by a previous attack of pleuro or other cause, are deficient in their store of loose fat, in comparison with what their touch, appearance, and the length of time they have been feeding, would lead one to expect. To the same cause I am disposed to attribute the somewhat lessened proportion of butter to milk and to cream, during the present, com-

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pared with what I have observed during several other seasons from similar treatment.* The proportions have been, from each quart of cream, 20 oz. of butter; and from 16 quarts of milk, 20 oz. of butter. On testing the quality of the milk by a lactometer, I find the proportion of cream less from those which have suffered from pleuro than those which have remained healthy: in one or two instances the difference is marked. In the quantity or yield of milk after recovery, I find little if any difference beyond what might have been expected from the lapse of time during illness.

On the 23d of March, the following results appeared:

	Quarts.		Oz.
Old milk,	340	making of butter,	402
Cream churned,	20		
Cream used,	3	would have made,	60
			462

20 oz. of butter from 1 quart of cream.
20⅓ oz. of butter from 16 quarts of milk.

This test was made purposely when the temperature of the dairy ranged at 54° to 56° from the time the milk was set up, without the appliance of hot water, described in a former Journal. The consistency of the cream was such, that on filling a cup, a spoon dipped into it stood erect, the cream being quite sweet.

The most correct way of ascertaining the quantity of thick cream, is to observe the height it reaches in the jar, and then measure the water required to fill the jar to the same height.

In May, with a considerable change of cows, the results were:

23⅛ oz, of butter from 1 quart of cream.
22 $\frac{6}{10}$ oz. of butter from 16 quarts of milk.

During the continuance of the disease, I was prevented from instituting comparisons on the effects of different food: my weighings were likewise discontinued, with the exception of one made on the 8th of October, when the cows were confined wholly to their stalls.

* The proportion of butter to milk and cream in the winter of 1854–55 was shown in my last paper to have been—
25 oz. butter from 16 quarts of milk.
25 oz. butter from 1 quart of cream.

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Comparison of different Methods of Feeding Dairy Cows.

Being desirous of comparing the result of my method of feeding dairy cows with the system usually practised in this locality, it occurred to me, that as my cows had been accustomed to savoury steamed food, a change to ordinary food would be attended with less favorable results than if they had been previously treated in the common mode; and that under these circumstances it would be better to institute comparisons with two near neighbors, Mr. Smith and Mr. Pawson, whose practice and results I had the opportunity of inspecting.

Mr. Smith's cow was of rather small frame, but noted for her usefulness as a good milker. At the time of calving her third calf, about the 12th of November, she was in good condition, and gave soon after 17 quarts of milk per day. Her owner states that in the first three weeks (up to the time this comparison was begun) her condition sensibly diminished—a result which I apprehend will be invariable with cows giving this quantity of milk when fed on meadow hay only, with which Mr. Smith's cow was supplied *ad libitum*, and of which she consumed 28 pounds per day. Mr. Pawson's was a nice heifer, three years old at the time of calving her first calf, October 6th, in more than ordinary condition, and gave about 16 quarts per day. Her owner states, that on the first of January her condition was much diminished; this is corroborated by Mr. Myers, a dealer in the village, who tells me, that previous to her calving, he was desirous of purchasing her, and would have given from 17*l*. 10*s*. to 18*l*., and describes her as being at that time full of beef. Her weight on the first of January, 7 cwts. 2 qrs., bespeaks her condition as much lowered.

During the month of October, and till late in November, she was turned out in the daytime to graze on aftermath, and housed during the night, where she was supplied with turnips. From the close of November till the first week in February, her food consisted of—

Meadow hay of inferior quality, ...	18 lbs. per day.
Swede turnips,.....	45 "
Ground oats, ...	9 "

After this the ground oats were discontinued, and meadow hay of good quality was given *ad libitum*, with 45 lbs. of turnips.

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For comparison, I selected a cow of my own, which calved about the 8th of October, and gave soon after 18 quarts of milk per day; she was also of small size. At the time of calving, her condition was somewhat higher than that of Mr. Smith's. When the experiment was begun, on the first of January, no perceivable difference was found in the yield of milk of Mr. Smith's cow and my own, each giving 15½ quarts per day.

The following Table gives the dates of calving of the three cows, together with their weights and yield of milk at the commencement and termination of the experiment:—

When Calved.	Yield at Calving.	January 1.				March 5.			
		Weight.			Yield.	Weight.			Yield.
	Quarts.	Cwt.	qrs.	lbs.	Quarts.	Cwt.	qrs.	lbs.	Quarts
Mr. Smith's—November 12,	17	8	3	0	15½	8	0	0	9½
Mr. Pawson's—October 6,	16	7	2	0	12	7	1	0	6½
My own—October 8,	18	9	3	0	15½	10	1	0	12½

Mr. Smith's cow lost in weight in nine weeks 84 lbs., being 9⅓ lbs. per week, with an average yield of 12½ quarts per day. Mr. Pawson's lost 28 lbs.: this loss, together with the diminished yield of milk, occurred almost wholly after the oats had been withdrawn. Her weight on the 6th of February being still 7 cwt. 2 qrs., and her yield of milk, 11 quarts per day.

My cow has gained, in the nine weeks, 56 lbs., being 6¼ lbs. per week, with an average yield of 14 quarts, the diminution being regular. January 1st, 15½; Feb. 4th, 14; March 4th, 12½; making an average yield of 14 quarts per day. The whole loss and gain of weight will be in flesh and fat, the cows having kept up their consumption of food and their bulk.

The weekly account of profit and loss will stand as follows:

	s.	*d.*
Mr. Smith's cow, average yield for 9 weeks, 12½ quarts per day, at 2*d.* per quart,	14	7
Deduct loss in flesh, 9⅓ lbs., at 6*d.*,	4	8
	9	11
Cost of 14 stones hay, at 6*d.* per stone,	7	0
Profit,	2	11

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			s.	d.
Mr. Pawson's cow, average during the first 5 weeks, 11½ quarts per day, at 2*d.* per quart,			13	5
Cost of 9 stones inferior hay (at 4*d.* per stone), per week,	3*s.* 0*d.*			
Cost of 63 lbs. ground oats, 4*s.* 8*d.*; turnips, 1*s.* 6*d.*,	6	2	9	2
Profit,			4	3

	s.	d.		
My cow, average yield for 9 weeks, 14 quarts per day, at 2*d.* per quart,			16	4
Gain of flesh, 6¼ lbs. per week, at 6*d.*,			3	1½
			19	5½
Cost of food:				
Hay, 63 lbs., at 6*d.* per stone; straw and shells of oats, 1*s.* 3*d.*; mangel, 1*s.*,	4	6½		
Rape-cake, 35 lbs.; bran, 10½ lbs.; malt-combs, 10½ lbs.; bean-meal, 10½ lbs.,	4	0½	8	7
Profit,			10	10½

The richer quality of the manure will probably compensate for the extra labor, cooking and attention bestowed upon my cow.

With a view of extending the comparison I give particulars of the whole of my cows, the weights of which were registered on the 8th of October, and which were still on hand, free from calf, and in a state admitting of comparison. These were bought at a neighboring market in but moderate condition: indeed with my mode of feeding I do not attach the same importance to high condition as a town-side farmer would. A cow in full condition attains her maximum yield in a week or so after calving, whilst those in lower condition continue, by my treatment, to increase their quantity up to about a month after calving.

The dates of calving are not precisely those on which the cows calved, but on which they were purchased as new calven cows. The prices named are those paid for the cows without their calves, except in one instance, the cow No. 1 being bought a few days before calving. They are what may be termed young cows, having had two or three calves each. The prices will disclose to those conversant with the subject, that the animals were not in high condition nor of high breed.

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TABLE.

No.	When calved.	Price.	Greatest yield per day.	October 8. Weight.	February 4. Weight.	February 4. Yield per day.	March 4. Weight.	March 4. Yield per day.	Computed average per day during	Gain, Oct. 8 to Feb. 4.	Gain in weight per week.
		£ s.	Quarts	Cwt. qrs. lbs.	Cwt. qrs. lbs.	Quarts	Cwt. qrs. lbs.	Quarts	Weeks. Qrts.	lbs.	lbs.
1,	July 28,	14 9	12	9 2 0	10 0 0	8	10 1 0	8	29 — 10	84	4
2,	Aug. 25,	15 14	18	10 0 0	11 1 0	14	11 1 0	14	27 — 16	140	6¼
4,	July 28,	15 9	18	8 2 0	10 1 0	15	10 0 0	15	31 — 15	168	8
6,	Sept. 8,	16 15	16	10 2 0	10 2 0	14	10 3 0	14	25 — 15	28	1¼
7,	Sept. 8,	17 9	16	10 2 0	11 0 0	10	11 0 0	10	25 — 13	56	2¾
11,	Aug. 25,	15 9	16	9 1 0	9 2 0	11	9 2 0	11	27 — 13½	28	1¼
Average,			16			12		12	27½— 14		

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My cows, during the period under consideration, were treated as follows:—During August and September they were on open pasture by day and housed by night; evening and morning they were supplied with mown grass, and two feeds of steamed mixture. Towards the close of September green rape was substituted for the mown grass, with the same allowance of steamed mixture; from the 8th of October, when they were wholly housed, they were supplied with steamed food *ad libitum* three times per day. After each meal 10 to 12 lbs. of green rape-plant were given, and 9 lbs. hay per day till November; from that time steamed food with cabbages or kohl rabi till the early part of February, when mangel wurzel was substituted. It will be observed that I give hay and roots in limited quantities, and the steamed food *ad libitum;* I prefer this to apportioning the cake and other concentrated food in equal quantities to each; as this steamed mixture contains more of the elements essential to milk, and each cow is thus at liberty to satisfy her requirements with it. Nos. 2 and 4, which have given the greatest quantity of milk, have eaten more than their share; whilst No. 1, which has given the least milk, has scarcely eaten more than half the quantity of steamed mixture consumed by 2 or 4. The yield of milk and the live weights on the 4th of February and the 4th of March scarcely vary. During February 34 lbs. of mangel were substituted for kohl rabi; with this change the cows became more relaxed. My experience in weighing, extending over several years, has shown me that when animals, from change of food, become more relaxed or more costive, their weighings in the former state denote less, whilst in the latter they denote more than their actual gain in condition. I have known instances in which a month's weighing, accompanied by some relaxation, has shown no gain, whilst in the following month, with restored consistency, the gain has doubled.

The results I have described are wholly over periods commencing from the time of calving, and during the first stages of milk, the longest extending over thirty-one weeks, when the production of milk is at the largest.

No. 4 suffered from pleuro in September, from which time her yield of milk fell off to less than two quarts per day.

Nos. 6 and 7 suffered also, and No. 11 considerably, after their weighing, Oct. 8th: each of them regained their yield of milk

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after recovery. It will be clear that their weights would have been greater had they continued in health throughout. In stating their produce of milk and food, I treat them as if they had remained in health.

I now proceed to examine the materials of food, their composition, and the probable changes they undergo in the animal economy:—

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Quantity and description of food supplied to six cows during 27½ weeks, and its composition in proximate elements and minerals.

	Per day.	Total weight of food given.	Cost per ton.	Total cost.	Weight of food when dried.	Albumen.	Starch.	Oil.	Fibre.	Minerals.
	lbs.	lbs.	£ s. d.	£ s. d.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Meadow hay,	56	10,715	4 . 0 0	19 2 9	9,420	990	4,257	287	2,933	953
Rape cake,	30	5,740	6 10 0	16 12 0	5,456	1,803	2,177	611	494	171
Malt combs,	9	1,722	5 9 0	4 3 0	1,660	411	791	51	320	88
Bran,	9	1,722	6 10 0	5 0 0	1,500	246	800	96	258	100
Beans,	9	1,722	9 6 8	7 3 6	1,500	464	774	34	176	53
Green food,	204	39,032	0 10 0	8 14 6	5,740	862	3,074	115	1,148	541
Oat straw,*	50	9,566	1 15 0	7 9 0	8,407	287	3,066	100	4,526	428
Bean straw,	12	2,296	1 15 0	7 16 0	1,964	376	725	51	594	217
Total,	379	72,515		70 0 9	35,647	5,439 =Nitrogen 888 lbs.	15,664	1,345	10,449	2,551

* The cost of shells of oats, of which I use an equal quantity, is 16s. per ton.

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Analysis of Milk by Haidlen.

Water,	873.
Butter,	30.
Casein,	48.2
Milk sugar,	43.9
Phosphate of Lime,	2.31
Magnesia,	.42
Iron,	.07
Chloride of Potassium,	1.44
Sodium and Soda,	.66
	1000.00

Production of milk by 6 cows, average 14 quarts per day each for 27½ weeks = 16,072 quarts, which at 41 ozs. per quart = 41,184 lbs.

	lbs.
When dry or free from moisture,	5230
Butter in 16,072 quarts at 30 per 1000	=1235
Casein " " 48.2 "	=1977
Sugar of milk	=1804
Minerals { Phosphate of lime, 99 / Other 115 }	= 214
	5230

Gain of weight 500 lbs., of which I compute 300 lbs. as fat.
200 lbs. as flesh.
500

Nitrogen,	316 lbs
Phosphate of lime,	99
Phosphoric acid,	=45.50

Cost of food per cow per week, 8*s.* 6½*d.*

When the yield of milk is less, the cost of food is reduced to 7*s.* 8*d.* per week.

	s.	*d.*
Gross return in milk,	16	4
" weight,	1	6
" manure,	2	8
	20	6

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Analysis of Excrement, by Professor Way. Per cent.

Moisture,	84.85
Phosphoric acid,	.39
Potash,	.58
Soda,	.22
Other substances,	13.96
	100.

Nitrogen,	.41	
Ammonia,	.49	
Manure 88 lbs. per cow per day.		
For 6 cows per day 528 lbs. = 3696 lbs. per week.		
" for 27½ weeks 101,028 lbs., containing		
of Nitrogen,		414 lbs.
Phosphoric acid,		393
Potash,		585
Nitrogen incorporated in food,		888 lbs.
Casein,	316.	
Fibrin,	7.35	
Manure,	414.	
Balance consumed in perspiration,	150.65	
	888.00	

The materials of food are shown to have cost ... £70.0*s.* 9*d.*

	£.	s.	d.
Gross value 16,072 quarts of milk, at 2*d.* per quart,	133	18	8
Gain of weight 500 lbs., at 6*d.* per lb.,	12	10	0
Nitrogen in manure 414 lbs. = Ammonia 494 lbs. at 6*d.*,	12	7	0
Phosphoric acid 393 lbs. at 1½*d.* per lb.,	2	9	1
Potash 585 lbs. at 3*d.* per lb.,	7	6	3
	22	2	4
	£168	11	0

	s.	*d.*
Manure per cow per day 88 lbs., per week 616 lbs.		
Containing ammonia 3 lbs.,	1	6
Phosphoric acid 2.40 lbs.,	0	3½
Potash 3.57 lbs.,	0	10½
Value of a cow's excrement, per week,	2	8

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The analyses of the chief ingredients of my own produce, or such extra materials as I usually purchase, have been made by Professor Way; for other materials I have had recourse to a very useful compilation by Mr. Hemming (vol. xiii., p. 449, of the Society's Journal), and to Morton's 'Cyclopædia of Agriculture.' The analysis of straw is that of oat-straw; that of green food is derived from the analysis of rape-plant, cabbages, and kohl rabi. During February and March I have been using wheat and barley-straw with mangel, and as these materials contain less oil, I give in the steamed food three ounces of linseed oil per day to each animal. For the composition of milk I adopt that by Haidlen, whose method of analysis is reputed to be the most accurate, the proportion of butter in my milk being this season very similar to that given by him.

It will be observed that this is the gross return for 27½ weeks from the time of calving, from which will have to be deducted expense of attendance, &c.

	£.	s.	d.
The materials used as food are found to have cost, ...	70	0	9
The value of these materials as manure consists of 888 lbs. nitrogen = 1061 lbs. ammonia at 6*d.*, ...	26	10	6
Phosphoric acid and potash, ...	9	15	4
Value of food if employed as manure, ...	£36	5	10
The 16,072 quarts of milk, at 2*d.* per quart for new milk, at which price it enters largely into consumption as food for man, amount to	£133	18	8

	£.	s.	d.	
The nitrogen in the milk 316 lbs. = ammonia 378 lbs., at 6*d.* per lb., ...	9	9	0	
Phosphoric acid in ditto 45½ lbs. at 1½*d.* per lb.	0	5	8	
				£9 14 8

From these statements it will be seen that materials used as *food for cattle* represent double the value they would do if used for manure, whilst that portion converted into *food fitted for the use of man* represents a value thirteen to fourteen times greater than it would as manure.

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It then appears clear that it is for the feeder's profit to use his produce as much as possible as food for cattle, with the view to convert it with the utmost economy into food for man, and *thus increase rather than enrich his manure-heap.*

The calculation of casein in milk is based upon the supposition that my milk is equal in its proportion of that element to that analysed by Haidlen. Several analyses by other chemists show a less percentage, 4 to 4.50. As my cows are adequately supplied with albuminous matter, I have a right to presume on their milk being rich in casein.

The loss of nitrogen by perspiration, 150.65 lbs., is nearly 17 per cent. Boussingault found a loss of 13.50 of nitrogen in a cow giving milk.

	£	s.	d.
The abstraction of nitrogen in the milk is computed at 316 lbs., value,	9	9	0
The abstraction of phosphoric acid in the milk is computed as 48½ lbs.,	0	5	8

Either the rape-cake or bran alone suffices for the restoration of the phosphoric acid.

The amount of phosphoric acid in the manure is 393 lbs., being about 16 per cent of the whole ash or mineral matter. The ash of meadow-hay contains about 14 per cent; that of rape-cake, 30 per cent; bran 50 per cent; malt combs, 25 per cent; turnips, &c., 10 per cent of phosphoric acid.

The amount of potash in the excrement is 616 lbs., being about 25 per cent of the whole ash or mineral matter. The ash of meadow- hay contains about 20 per cent; rape-cake, 21 per cent; malt combs 37 per cent; turnips, (various,) 44 per cent; from which it may be inferred that the sample of excrement sent to Professor Way for analysis, did not contain more than a fair proportion of these ingredients.

To ascertain the quantity of excrement, the contents of the tanks into which the cows had dropped their solid and liquid excrement during five weeks, were weighed, and found to be 500 cwt., 2 qrs., 0 lbs., from 18 cows, being 88 lbs. per cow per day. The sample for analysis was taken from that which the cows had deposited within the preceding 24 hours. This was collected in the mud cart, well blended, and sent off quite fresh.

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It is sufficiently proved by the experience of this district, that 20 lbs. of meadow-hay suffice for the maintenance of a cow of fair size in store condition: a like result is stated to be obtained from 120 lbs. of turnips per day. The six cows will have then required during the 27⅓ weeks for their maintenance only—

lbs. Per day.	Weeks.	Total Weight. lbs.		Albuminous matter.	Oil.	Starch, &c.
120 of hay, or for	27⅓	22,960	containing of	2127	616	9130
720 of turnips, or for	27⅓	137,760	"	2295	306	9100

They will further have required adequate food—

	Albuminous Matter, Fibrin, and Casein.	Oil and butter.	Starch and sug. of m'k.
For the production of	2,116	1,235	1,894
Add for maintenance by turnips,	2,295	306	9,100
	4,411	1,541	10,994
The food supplied is computed to have contained	5,459	1,345	15,664

I omit the minerals which are observed to be in excess of the requirements.

For the maintenance of a fair sized cow for one day in a normal state, the following elements seem adequate:

	Albumen.	Oil.	Starch, &c.	Mineral ingredients. Lime.	Phosphoric acid.
In 20 lbs. of hay,	1.85	.536	7.95	.90	1.11
120 " turnips,	1.98	.26	7.82	.97	1.9

When cows are in milk, there occurs a much greater activity of the functions; they eat and drink more, evacuate more excrement, and, in all probability, spend considerably more food in respiration. Whilst the 17.60 lbs. per day dry matter in 20 lbs. of hay are found adequate for the maintenance of a cow in a store state, the six cows in milk have eaten on the average 21.37 lbs. solid matter per day during the 27⅓ weeks. When I have fattened cattle together with a number of milk cows of similar size, which gave on an average eight quarts of milk per day, the whole being fed with moist steamed food, and receiving the same allowance of green food, I have found the fattening cattle refuse water, whilst the milk cows on the average drank upwards of 40 lbs. per day of water given separately: the eight quarts of milk

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contain only about 17.58 lbs. of water; still, in several analyses of excrement I have noticed little difference in the percentage of moisture in that from the fattening animals as compared with that from cows giving milk.

These facts would seem to show that upwards of 20 lbs. more water were given off from the lungs and pores of the skin of a milking than of a fattening animal.

The excrement of the six milk cows, 88 lbs. per day on the average, is found to contain of nitrogen .36, equal to that in 2.25 lbs. of albumen; whilst 1.85 of albumen in the 20 lbs. of hay is found adequate for maintenance.

On comparing the supply of the food to the six milk cows with their requirements and production, there seems an excess in the albuminous matter, a deficiency in the oil for the fat and butter, an excess in the starch, &c. Taking, however, the increased activity of the animal functions and consequent consumption of food by the milk cow, I am not encouraged to lower my standard of food. That it has sufficed, is abundantly proved, as each of the six cows under observation has gained in condition during 27⅓ weeks.

My observations on nutrition tend to the conclusion, that if you supply animals with starch, sugar, &c., to satisfy their requirements for respiration, you enable them to convert the oil of their food into butter or fat to such extent as their particular organism is fitted for effecting it.

In the treatment of the six cows, it will be seen that the oil in the food is inadequate for the supply of the butter and of the fat, some portion of which will have been derived from the starch, sugar, &c. Of the efficacy and adaptation of these for the production of fat, I propose to explain my views by drawing a comparison as to the production of food adapted for the use of man in the form of beef and of milk, on which I find in recent and deservedly popular works what appear vague and extravagant statements.*

* Professor Johnston, in his "Agricultural Chemistry," (p. 406,) quotes, (though with hesitation,) Sir John Sinclair and M. Riedesel, the former of whom states that the same weight of herbage which will produce less than 30 lbs. of dry human food in the form of beef, will yield 500 lbs. in the form of milk; and the latter says that the same quantity of hay will produce either 100 lbs. of beef or 1000 pounds of milk.

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On entering upon this comparison, it is necessary that I should explain my conclusions on a subject to which, as far as my reading and information extend, little inquiry or attention has been given, viz., the whole gain of weight and the proportions of useful material and offal made by cattle whilst fattening.

Weight of meat gained by fattening cattle.—Not being a breeder of horned stock, I purchase my milk cows and cattle for fattening in the markets of the neighborhood. I prefer, for fattening, full-grown cows, which have had one, or, at the most, two calves, at from three to five years old. The breeds of this district are mixed Short-horns, the bulls used having a large admixture of Short-horn blood. The live weight of the cattle I buy for fattening, is from 7 cwt. to 9 cwt. each. Their capability of carrying additional weight may be taken at 3 cwt., so that when prime fat, they will weigh from 10 to 12 cwt. Their dead or carcase weight, if killed in a lean state, will be less than one-half their live weight, varying probably from 43 to 46 per cent. In Morton's "Cyclopœdia," article on meat, the comparison of carcase and live weight is stated as 50 per cent. when half fat, of cattle of like quality. This tends to confirm my estimate of the proportion of live to dead weight of lean stock.

I will consider, for example, a lean animal weighing 8 cwt., and capable of weighing when prime fat, 11 cwt. live weight; when fairly started, and with proper feeding, I should look for an average gain of 14 lbs. per week live weight. At this rate it would require 24 weeks to bring it to a state of prime fatness, and the comparison of live and dead weight when lean and fat would stand as follows:

Lean, ---	Live weight = 8 cwt.	
	Dead weight, at 45 per cent, =	28¾ stone.
Fat, ----	Live weight = 11 cwt.	
	Dead weight, at 60 per cent, =	52¾ "
	Gain in dead weight in 24 weeks,	24 "

or 14 lbs. per week, being precisely the average gain in live weight.

In the course of feeding there is a gradual increase of interior fat of two descriptions—fat in the loins, which is weighed with the carcase, and loose fat or tallow which counts as offal. Even though this loose fat counts as offal, it is well known that cattle

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well stored with this weigh heavier in proportion when killed than those with less, and which are in lower condition. A consideration of this has led me to infer, that with the increase of this interior fat there occurs a displacement of material in process of digestion; and on inquiry of butchers of experience, I learn that one characteristic of a beast which kills well, is to have a little stomach. On looking over the items of offal of full-grown animals, they appear capable of little variation in the same animal, except the loose fat and the stomach, in each of which there occurs a difference of 100 lbs., or upwards.

The writer of the article on Meat, in Morton's "Cyclopœdia," attributes this greater carcase weight of fatted beasts to greater solidity: to hollows being filled up and protuberances being formed. It seems, however, clear that this would equally affect the live weight, and does not therefore satisfactorily explain the matter just mentioned.

If these views be correct, it appears that besides a gain of carcase weight, which is shown to be 14 lbs. per week, on animals which gain this in live weight, there is likewise a gain of loose fat, which, from observation, I am led to estimate at 3 lbs. per week, or 72 lbs. for the 24 weeks. An animal in a lean or store state, will contain about 30 to 35 lbs. of loose fat. After 24 weeks' feeding, I should expect 104 to 112 lbs. of loose fat.

The gain in carcase weight I estimate as 14 lbs. per week.
" in loose fat,..... 3 "

Whole gain per week,..... 17 lbs.

I may here remark, that if the feeder expect a weekly return equal to the price of the whole of the gain in live weight, he is likely to be mistaken. Though favorably situated for the purchase of stock, I am seldom able to purchase lean stock, which, if killed at the time of purchase, would not, in accordance with the computation stated, cost more per lb. than the price of fat stock at the same time. The difference in my case will be from 30*s*. to 40*s*. per beast, which will be a deduction of 1*s*. 6*d*. to 2*s*. per week from the earnings reckoned on the gain of live weight.

In addition to the interior fat, tallow, and suet, there is an increase in the fat of the beef, and of that mixed with the flesh. That this increases in a greater proportion than the flesh, seems clear as fat beef is a term used to signify beef having a greater

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proportion of fat to flesh. I am therefore disposed to estimate the gain per week as composed of

	lbs.
Loose fat or tallow, per week,	3
Fat with beef and suet in the loin,	8
Fibrine or flesh,	6
Total gain per week,	17

As flesh contains 77 per cent. moisture, the weekly gain for each in dry material will be—

	lbs.
Fat,	11
Dry fibrine,	1.38
	12.38

Extending this over 27½ weeks, six cows would have gained in fattening—

	lbs.
Fat,	1802
Dry flesh,	226
	2028

The gain by milk cows has been, during 27½ weeks—

	lbs.	lbs.
In butter,	1235	
" sugar,	1894	
" fat,	300	
Gain in respiratory elements,	——	3429
In casein,	2100	
" fibrine,	46	
	——	2146
Salts or mineral matters,		240
		5815

The whole computed gain in solid food by milk-cows is nearly three-fold, whilst that of casein is nearly *ten-fold* the amount of dry fibrine gained in fattening.

There is besides a consideration affecting the two processes: by that of milking there is a continuous drain on the albumen of the food by the production of casein, whilst by fattening the tendency is to repletion of the fibrine. When this has acquired its full development, the requirements of albumen in the food will be limited to what is necessary for the maintenance of the flesh.

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Excrements of Fattening Cattle.—With the object of informing myself, and for the better understanding of my practice, I had recourse to the following experiments during the years 1852 and 1853. Eight fair-sized fattening cattle were supplied daily with

18 lbs. oat straw, shells of oats, and bean-straw.
4 " rape-cake and bean-meal.

22

with which they drank about 70 lbs. of water each. The yield from this in solid and liquid excrement was found to be, for every 100 lbs. fodder and water, 72½ lbs. excrement, being about 10 tons per animal during the year. I give the analysis of the excrement by Professor Way:—

	lbs.
Moisture,	81.77
Organic matter, sand, and silica,	15.51
Phosphate of lime,	.65
Other substances,	2.7
	100.00

Nitrogen .45 = ammonia .54 per cent.

The next cattle under experiment were eight heifers which had scarcely attained their full growth. After allowing a short time for change of food, they gained evenly and steadily throughout 16 weeks, during which their weight increased from 7¾ to 9¾ cwt. each (on the average), being 14 lbs. per week. They were supplied with turnips or other green food at the rate of 60 lbs. per day—with chopped straw, together with 4 lbs. rape-cake and 2 lbs. of bean-meal each per day for ten weeks; from this time, during six weeks, to the conclusion of the experiment 3 lbs. each per day of rape-cake in addition, making 7 lbs. rape-cake and 2 lbs. bean-meal per day for each. I supply the amount and description of food for 21 days, during which the 7 lbs. of rape and 2 lbs. of bean-meal per day to each were given:—

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	Weight of Food. lbs.	Composition of Food. Water.	Organic.	Mineral.
Rape cake,	1176.	99.84	1042.	34.10
Bean meal,	336.	48.50	278.75	8.75
Shells of oats,	1260.	dried	1162.	98.
Swede Turnips,	10080.	8907.	1100.	73.
Hay of inferior quality,	1176.	165.25	949.50	61.25
Water,	846.	846.	....	....
	14874.	10066.59	4532.25	275.10
Excrement,	9600.	8152.	1163.50	284.25
Deficiency,*	5274.	1914.59	3368.75	plus 9.15

Nitrogen in Rape cake,	59.04
" Beans,	16.75
" Shells of oats,	8.
" Turnips,	28.
" Hay,	12.
	123.79 lbs.
In 9600 lbs. excrement ..... Nitrogen	75.84
In 169 lbs. flesh dry fibrine, 38.87 = Nitrogen	6.24
	82. 8
Nitrogen spent in perspiration, ...	41.71
	123.79

The gain in weight during these 21 days was 338 lbs., or 14 lbs. each per week. The proportion of flesh is assumed to be 169 lbs., or one-half the gain of weight, and seems ample, though the cattle were still growing.

The analysis of the excrement by Professor Way gives, of

Moisture,	84.92
Organic matter, with salts of ammonia,	12.12
Sand,	.93
Phosphate of lime,	.72
Alkalies, sulphates, &c.,	1.31
	100.00

Nitrogen .79 = ammonia .96.

* Chiefly consumed in respiration and perspiration, the remainder being converted into flesh, fat, &c,

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Barral states the proportion of the nitrogen which escapes by perspiration as one-third or one-fourth of that in the food. Boussingault found that in a cow giving milk there was an escape of 13.50 per cent. of the nitrogen, whilst a turtle dove parts with 35.04 per cent. of this element. This loss of nitrogen seems hitherto to have been little noticed by practical feeders. It seems possible that this loss may be increased by too liberal a supply of albuminous matter in the food.

The next experiment was on eight cattle, and commenced March, 1855; the first six weeks after they were tied up, their food consisted of chopped straw, shells of oats, and bean-straw, in about equal proportions; 4 lbs. of rape-cake, 1 lb. bean-meal, ½ lb. linseed, and ½ lb. wheat ground together, and 30 lbs. swedes per day. The straw, &c., were cooked by steaming. On this food two of the heifers had gained 9 lbs. each in the month's weighing, the others 16 lbs. and 18 lbs. each per week; the average being somewhat more than 14 lbs. per week. A sample of the excrement was sent on the 26th of March to Professor Way for analysis, which gives—

	lbs.
Moisture,	83.81
Organic matter,	13.44
Sand, &c.,	.93
Phosphate of lime,	.64
Common salt,	.18
Sulphate of soda and potash,	.95
	99.95

Nitrogen .51 = ammonia .62.

The yield of excrement is at the rate of about 9½ tons per year; value 8*s*. 6*d*. per ton; or 1*s*. 7*d*. per week for each.

My store of turnips being exhausted with March, an additional proportion of bean-straw, with the above-mentioned allowance of rape-cake, bean-meal, linseed, and wheat ground together, was supplied till the 24th of May, when a portion of meadow-grass was mixed with the straw, and by degrees the straw was discontinued; when mown grass, together with the same allowance of extra food, was given till the close of June, when the lot were of prime quality, and sold for the top market price. Up to the

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close of May their gain averaged over 14 lbs. per week; during June they gained something less than 14 lbs. per week. On the 29th of June a sample of excrement was sent to Professor Way, who reported its contents:—

	lbs.
Moisture,	84.90
Organic matter,	11.94
Sand,	.86
Phosphate of lime,	1.33
Common salt,	.24
Sulphate of soda and potash	.76
	100.00

Nitrogen .94, = to 1.14 ammonia.

The yield of excrement was at the rate of 9½ tons per year, and its value in ammonia and phospate of lime may be computed at 15*s.* per ton, being at the rate of 2*s.* 10½*d.* per week for each, to which the sulphate of potash will be an appreciable addition.

It will be observed that the bulk of food supplied when this sample of excrement was sent for analysis was meadow-grass, at the time of year when it is rich in nitrogen, and this would materially affect the proportion of nitrogen in the excrement. It would have afforded a more correct test of my views as to the disposition of animals to assimilate more of nitrogen in the early, and of fat in the later stages of feeding, if the same food had been continued throughout. Still, when I find in the advanced stage of feeding the excrement doubly rich in nitrogen, with scarcely an equal gain in weight, this tends to confirm such an inference.

It seems probable that the supply of extra food, during June, as far as regards the nitrogenous principle, was superfluous. The cost of this extra food is 3*s.* 2½*d.* per week; the increase in the value of the excrement will be about 1*s.* 7*d.*, as the excrement without the extra food would probably have been worth 1*s.* 6*d.* per week.

On each occasion the sample of excrement sent for analysis, was taken from the quantity of solid and liquid evacuated during the preceding 24 hours, well blended and sent off quite fresh.

These experiments were concluded in June, 1855, since when my treatment has undergone some modifications.

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Efficacy of sugar and starch in the production of fat.—I now call attention to a subject which has been long a matter of controversy amongst the teachers of agricultural chemistry, and which may be considered as barely settled—the efficacy of sugar and starch in the production of fat. In the Highland Agricultural Society's Journal, I find well authenticated and reliable statements by Mr. Hope, of Fenton Barns, and others, to the effect that cattle supplied with turnips—170 lbs. to 180 lbs. per day, with 5 lbs. of straw per day—had gained throughout a course of feeding 14 lbs. per week—a gain I have scarcely found exceeded, taking the average of a lot for a lengthened course. From various analyses of these materials, and selecting those of good average quality, I deduce the following proportions in lbs. for 24 weeks:

	Per day.		In 24 weeks.			
				Composition.		
	Natural state.	Dry.	Whole weight dry.	Albuminous matter.	Oil.	Starch, &c.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Turnips,	175	19.25	3,234	485.10	64.68	1,940
Straw,	5	4.40	1,056	31.50	7.	420
	180	23.65	4,290	516.60	71.68	2,360
As requisite for maintenance only, without gain,	120	13.20	2,217	332.55	.....	1,440.80
The remainder for increase,				184. 5	71.68	919.20

lbs.

I assume* the oil or fat of 120 lbs. of turnips per day, (or for 24 weeks, 44.34 lbs.) to be required for maintenance, and compute it as equal to starch, in proportion of 2 lbs. of oil to 5 lbs of starch and sugar, or 44.34 lbs. ..... =110.88

Starch and sugar in 120 lbs. of turnips per day for 24 weeks, ... 1330.12

1441.

* *Vide* Lehmann, Cavendish Society's Ed., vol. iii.

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It will be observed that the 184.5 of albuminous matter is greatly in excess of what is required for assimilation or increase of flesh. This supply of albumen represents 7.66 lbs. of dry fibrine per week, which, with the usual proportion of moisture, 77 per cent, is equal to a gain per week of 33.30 lbs. of flesh, whilst my computation of gain per week in flesh is only 6 lbs. It then follows, that the manure or excrement from cattle, whilst fattening on turnips only, will be richer in nitrogen than when supplied only with the quantity required for their maintenance.

Professor Way, in the Royal Agricultural Society's Journal, vol. iv., p. 181, gives the analyses of twenty-two kinds of grasses in the dry state, comprising most of those which prevail on our feeding pastures, from which he derives an average of

Albuminous matter.	Oil and fat.	Starch, sugar, &c.
10.98	3.08	45.57

These analyses were made on grasses chiefly when in flower. Every grazier of experience will agree in saying that grass in a younger state will fatten more satisfactorily. This younger grass will differ chiefly in its less proportion of woody fibre, which, in the grasses analysed by Professor Way, averaged 35 per cent. A portion of this will, in the younger grasses be represented by sugar, starch, &c.; their percentage of moisture is also greater.

There are no grounds whatever for assigning to the younger grasses a greater percentage of albuminous matter or flesh-forming principle.

The proportion of woody fibre is doubtless considerably influenced by the quickness of growth also, to which I have called attention in a former number of this Journal, the plants of quicker growth having a less proportion of woody fibre, and more of starch, sugar, &c. And to this I am disposed in a great degree to attribute the fattening properties of fertile pastures in comparison with those on poorer soils—in corroboration of which I may state that I have, by dressing with bones and other manures, inducing quickness of growth, converted old store pastures on clay, on which cattle would graze for a season with but little increase, into fattening pastures. Mr. Garnett also, of Wharfeside, near Otley, has found a like effect from top-dressing pasture with guano, at the rate of 1 cwt., and 1 cwt. common salt per acre for three seasons in succession; this pasture on alluvial loam

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carries in consequence 50 per cent. more cattle, and fattens them much more quickly than before. Mr. Garnett attributes this not solely to the increased produce, but also to the improved quality of the grass, which in my estimation will in a great measure be owing to the greater percentage of sugar, starch, &c.

Assuming that cattle whilst on pasture require an equal quantity of solid matter as when supplied with 175 lbs. turnips and 5 lbs. of straw per day, they would consume 23.65 lbs., or 4,290 lbs. in 24 weeks, and taking into account that pastures have some admixture of perennial clovers, which are richer in albuminous matter than the natural grasses, we may compute the percentage of abumen as increased to 12 per cent. Thus the 4,290 lbs. consumed in 24 weeks will contain of albuminous matter 516 lbs.; that in the turnips with straw is computed at 516.60.

These enquiries tend to show that the increase of oilcake and other substances, rich in albuminous matter, in the more advanced stages of feeding, has no other effect, *so far as the nitrogenous matter is concerned*, than to enrich the manure; they tend likewise to show that the gain of weight in fattening is much more due than has hitherto been supposed, to the oil and other respiratory or fat-forming ingredients of the food.

I compute the gain of fat per week as consisting of—

	Lbs.
Loose fat, or tallow,	3
Suet, or fat in the loin,	1
Fat mixed with meat and sold as beef,	7
	11

Nor do I think this an over-estimate, as it will be admitted that the gain of carcase fat, independent of the loose fat or tallow, is greater than that of flesh. The whole of the exterior of the carcase immediately under the skin is covered with a layer of fat, which, when the beast is lean scarcely exceeds $\frac{1}{8}$ to $\frac{1}{4}$ inch in thickness, whilst in fattening it increases frequently to $1\frac{1}{2}$, *i. e.* sixfold or upwards. The fatty portions throughout increase also, and the flesh becomes intermixed with fat, and assumes what is termed the mottled appearance, which is the characteristic of beef of prime quality.

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The 24 weeks will then show an increase of 264 lbs. of fat. As the oil in the turnips and straw is computed to be only 71.65 lbs., there does not remain a doubt on my mind that the greater proportion of fat stored up in this course of feeding is derived from the starch, sugar, &c.

In computing the proportion of fat derived from starch, a different relation obtains from what is observed in its efficacy for respiration, owing to the greater percentage of oxygen in starch and sugar as compared with that in oil, oxygen being required in much larger quantity than carbon or hydrogen in the respiratory process.

	Oxygen.	Carbon.	Hydrogen.
Starch and sugar contain on an average,.....	51.36	42.23	6.41
Fat or oil, ...	10.13	78.13	11.74

The proportion of carbon to hydrogen in each is very similar, being somewhat less than 7 of carbon to 1 of hydrogen, from which it appears that nearly 2 lbs. of starch are requisite to make 1 lb. of solid fat, or about 90 of starch for 50 of fat.

Physiologists attribute to fat, besides the maintenance of heat, the property of facilitating digestion. Lehmann describes fat as one of the most active agents in effecting the metamorphosis of food, and confirms this by his own experiments, and others by Elsasser.

It seems probable that the English feeder in fattening his cattle, and the foreign cook who saturates the lean-fed beef of his country with olive oil, are alike unconsciously pursuing the same object—that of rendering their material more easy of digestion, and consequently more palatable.

In my treatment of *dairy* cows I find it advantageous to supply, in addition to ordinary food, materials particularly rich in albuminous matter, and to give more in proportion to those cows which give the largest yield of milk.

My conclusions in regard to *fattening* are, that by ordinary food you can afford an adequate supply of albumen for the maintenance and likewise for the increase in assimilation of fibrine, and that the gain by fattening is in a great measure due to the starch, sugar, and other fat-forming principles, in which I include oil:

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without a due proportion of oil I should not expect success in fattening.

Value for feeding purposes of various articles of food.—I now propose to examine the composition of materials chiefly used for feeding, and their efficacy for the production of fat. I give the percentage of starch, sugar, &c., and reduce them to fat, taking the proportion as 90 of starch, sugar, &c., to 50 of fat. I supply likewise the percentage and value of their fertilizing constituents, which are of importance to the farmer and feeder. The computations were made on the materials in their usual state of dryness, except in the case of turnips, which are taken as free from moisture, and therefore valued at 4*l.* 10*s.* per ton, = 10*s.* per ton in the natural state.

From the following tabular statement, it will be found that in wheat straw, for which I pay 35*s.* per ton, I obtain for 1*s.* 2½*d.*, .50 oil and 32 lbs. starch, or, (the starch reduced as oil,) 18½ lbs., available for the production of fat or for respiration. I know no other material from which I can derive by purchase an equal amount of this element of food at so low a price. The value of straw calculated as manure is 9*s.* 7*d.* per ton.

Swedish turnips, at 10*s.* per ton, give of oil and starch reduced as oil, 35 lbs. for 2*s.* 2¼*d.* In comparative nutritive value, 10*s.* per ton is much too low an estimate.

Oil-cake, *beans*, *Indian meal*, and *locust beans*, have been taken at the same price, viz., 1*d.* per lb., or 9*l.* 6*s.* 8*d.* per ton; any variation in their relative market value will alter the figures here given in the same proportion. Of the four, oil-cake is found to be the cheapest at the same price, being much preferable to beans for fattening. The locust, or carob bean, at the same price, is *much* the dearest.

In these computations, the albuminous matter is calculated only on its value as manure. When assimilated in flesh or fibrine, it has a higher value in proportion to its weight than fat, and it is on the due apportionment of materials, rich in albuminous matter that our success in feeding cattle with profit in great measure depends. For the purpose of acquiring more precise information, I availed myself of the assistance of Professor Way, who selected for analysis a piece of beef, *particularly lean*, and reported it to consist of—

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Water,	53.81
Fat,	3.10
Albuminous matter,	24.06
Other substances,	19.3
	100.00

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Cost and composition of 100 *lbs. of the following substances used for feeding:*

	Cost.		100 lbs. contain								Value of nitrogen, phosphoric acid, and potash.	Deduct nitrogen for perspiration.	Net value for manure.
	Per ton.	Per 100 lbs	Oil.	Starch, sugar, &c.	Oil, starch, &c. computed as oil.	Nitrogen.		Phosphoric acid.		Potash.			
						Weight.	Value.	Weight.	Value.	Weight.	Value.		
	£ s. d.	s. d.	lbs.	lbs.	lbs.	lbs.	d.	lbs.	d.	lbs.	d.	s. d.	d.	s. d.
Meadow hay, ...	4 0 0	3 7	2.68	39.75	24.63	1.48	10.62	.90	1.35	1.50	4.50	1 4½	2 1-12	1 2½
Wheat straw, ...	1 15 0	1 7	.50	32.	18.50	.42	3.	.14	.21	.65	2.16	0 5	½	0 5
Swedish turnips, ...	4 10 0	4 0	2.	60.	35.	2.40	17.28	.80	1.20	2.25	6.75	2 1½	3½	1 9½
Oil cake, ...	9 6 8	8 4	12.	38.	33.	5.	36.	2.25	3.37	1.75	5.25	3 8½	7½	3 1½
Beans, ...	9 6 8	8 4	2.	42.	25.30	4.45	32.	.86	1.29	1.11	3.33	3 0½	6½	2 6
Indian meal, ...	9 6 8	8 4	7.	60.	40.	2.25	16.20	.19	.28	.17	.51	1 5	3½	1 1½
Carob or locust bean,	9 6 8	8 4	6.76	57.	35.	.64	3.75	No analysis of ash.				say 0 5½		0 5

Cost of fat derived from 100 *lbs. of the following feeding substances:*

	Meadow hay.	Wheat straw.	Swedish turnips.	Oil cake.	Beans.	Indian meal.	Carob beans
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Cost of 100 lbs., ...	3 7	1 7	4 0	8 4	8 4	8 4	8 4
Deduct net value for manure, ...	1 2½	0 5	1 9½	3 1½	2 6	1 1½	0 5
Cost for production of fat, ...	2 4½	1 2	2 2½	5 2½	5 10	7 2½	7 11
Oil and starch, &c., computed as oil in lbs., ...	24.63	18.50	35.	33.	25.30	40.	35.

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This material, though of its kind particularly rich in nitrogen, is not worth more as *manure* than 2*s*. 6½*d*. per 100 lbs., or less than one-twentieth of its value as *food*.

These investigations, which have more or less occupied my attention for several years, have changed considerably my mode of treatment for fattening. I am satisfied that the *most economical* use of food rich in albuminous matter, is together with straw or other materials which are deficient in this element. I now use for fattening, *bean* and *oat-straw* and *shells of oats* in equal proportions, with a limited supply of *turnips*, never exceeding 60 lbs. per day to each, and the following extra food:

3 lbs. of rape cake,..
¾ lb. malt combs, } steamed together with the straw.
¾ lb. bran,.....

If my turnips fail in spring, by supplying 2 to 2½ lbs. of rape-cake in addition, I find the result equally favorable. On this fare my cattle thrive satisfactorily, and make usually at the rate of 14 lbs. per week each. I sometimes substitute ½ lb. per day of linseed oil for the 2 lbs. of rape-cake without turnips, the gain by which I find satisfactory. One of a lot of 14 fed in this mode gained at the rate of 24 lbs. per week from March up to July, 1856, being the greatest gain I have observed in the course of my experience as a feeder.

Having received numerous applications from vendors to become a purchaser, and inquiries as to what I thought of the properties of carob or locust beans, I may call attention to its comparative composition with Indian meal, which it most nearly resembles, and in comparison with which its value is decidedly inferior. There is little difference in the feeding effects of sugar and starch; the former contains somewhat more of oxygen, which in some slight degree facilitates its consumption in the respiratory process; but in the same ratio it is deficient in carbon, and has consequently less of the property of producing fat.

The respective quantities of oxygen from the air required for the consumption of

100 parts of	starch are,.....	118.52
"	sugar,.....	106.67
"	fat,.....	292.14

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These numbers seem to denote the comparative labor or exercise of the organs of respiration requisite for the consumption of these elements of food respectively, or, in other words, for the support of vitality. Their relative composition is—

	Carbon.	Hydrogen.	Oxygen.	
Fat,	78.13	11.74	10.13	per cent.
Starch,	44.45	6.17	49.38	
Sugar,	40.	6.66	53.34	

Whilst these analyses have been in the course of preparation, with the view of being inserted in the Society's Journal, another month has elapsed, during which I have proceeded with my observations on dairy produce. On the 12th of March I purchased Mr. Smith's cow (see p. 712) for 12*l.* 10*s.*, being more than her market value, for the purpose of trying her on my food; her yield of milk had then diminished to 8 quarts per day. On the 31st of March, four weeks from the former weighing, and nineteen days after being treated with my food, her yield of milk had increased to 9½ quarts per day, and her weight to 8 cwt. 1 qr., being 28 lbs. increase.

Mr. Pawson's cow, which was continued on the same food, viz., meadow-hay *ad libitum*, and a more limited supply of turnips, reduced her yield of milk to less than 5 quarts per day, without alteration in her weight.

My cow first placed on trial with those of Mr. Smith and Mr. Pawson, gave a yield of milk of 12 quarts per day, and gained 28 lbs. in the four weeks, her weight on the 31st of March being 10 cwt. 2 qrs.

The weight and the yield of milk of the six, on the 31st of March, were—

	March 4.	Yield of milk per day.	March 31.	Yield of milk per day.	Gain in 4 weeks.
	cwt qrs lbs	quarts.	cwt qrs lbs	quarts.	lbs.
Weight of No 1,	10 0 26	8	10 3 0	8.9	58
" 2,	11 1 0	14	11 3 0	14.9	56
" 4,	10 0 0	14½	10 1 0	13	28
" 6,	10 3 0	14	11 2 0	12	84
" 7,	11 0 0	10	11 3 0	10	84
" 11,	9 2 0	11	10 1 0	12	84

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On referring to the previous weighing, there was little or no gain from Feb. 4th to March 4th, the cows being at that time in a somewhat more relaxed state. During March they wholly regained their consistency. The gain shown in the weighing, March 31, by the six cows, appears therefore unusually great. It should however be computed as made during the eight weeks, from Feb. 4th to March 31st, being with an average yield of nearly 12 quarts (11.66) per day each, at the rate of $8\frac{1}{2}$ lbs. each per week on the average.

No. 11, it will be observed, is stated as giving more milk on the 31st than on the 4th of March. It occasionally happens that cows drop their yield of milk for a day or two, and then regain it, especially when in use. The whole of these six cows were kept free from calf till February, when Nos. 2 and 4 were sent to bull. I had some hesitation in regard to No. 4, from her having suffered from pleuro. Her milk, tested by a lactometer, denoted a less than average proportion of cream; still in quantity, and keeping up its yield for a length of time, being of more than ordinary capability, I decided to retain her.

Nos. 1 and 7, which are giving respectively 8 and 10 quarts per day, are in a state of fatness; they will probably be sold in June as prime fat, when their yield of milk will probably be 6 and 8 quarts per day each. They may be expected to fetch 20*l.* to 23*l.* No. 6 is also in a state of forwardness. No. 11, which suffered considerably from pleuro, is in comparatively lower condition.

During the season, from the close of October to the close of January, I avoid purchasing near-calving cows, which are then unusually dear, my replenishments being made with cows giving a low range of milk and intended for fattening: I find them more profitable than those which are quite dry. The present season I had additional grounds for abstaining from buying high-priced cows from the recent presence of pleuro.

On the 2nd of March I had occasion to purchase a calving cow, which was reported to have calved on the 28th of February. Her weight on the 4th of March was 9 cwt. 1 qr. I supplied her with 35 lbs. of mangel, and hay *ad libitum*, of which she ate 22 lbs. per day. The greatest yield she attained was somewhat more than 13 quarts per day. On the 31st of March her weight was 9 cwt., being a loss of 28 lbs. in four weeks. Her yield of milk

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had diminished to 11¼ quarts per day: a week after this her milk, during six days, was kept apart, and averaged 10 quarts per day; being at first rather more, at the close rather less, than this. The cream produced from these 60 quarts was 9 pints, the butter 63 oz. The butter from each quart of cream was 14 oz. The proportion of butter to milk was 63 oz. from 60 quarts—rather more than 1 oz. per quart.

An equal quantity of milk from a cow (calved Oct. 8th) treated with steamed food, and set apart for comparison, gave less than 7 pints of cream, which produced 79 oz. of butter.

In quality and agreeableness the butter from steamed food and cake was decidedly superior to that from hay and mangel.

Mr. Stansfeld, of Chertsey, has supplied me with the following interesting particulars of two Alderney cows which were treated as follows:—

	Rape-cake.	Bean-meal.	Bran.	Malt-combs
	lbs.	lbs.	lbs.	lbs.
From Dec. 1st to Jan. 15th with swedes and meadow-hay.				
From Jan. 15th to Feb. 17th, pulped and fermented swedes, meadow-hay, and.....	3	2	2	2
From Feb. 17th to May 1st, ...	5	..	2	2

Results:—

December 1st to January 15th, yield of butter from each quart of cream 10¾ ozs.

January 15th to February 17th, yield of butter from each quart of cream 14 ozs.

February 17th to May 1st, yield of butter from each quart of cream 18⅔ ozs.

The yield of butter in proportion to milk, Dec. 1st to Jan. 15th, is described as unsatisfactory.

The yield of butter in proportion to milk, Feb. 17th to May as 2 ozs. per quart, which is their maximum proportion.

Soon after calving the two cows gave 18 quarts of milk per day; on the 15th of May 15 quarts per day.

Mr. Stansfeld has completely satisfied himself that by the process of fermentation the turnip loses its disagreeable taste, and that his butter is of excellent quality.

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If I take the supply of turnips, 120 lbs. per day, as requisite for the maintenance only of the cow, the nutritive elements will be—

Albumen.	Oil.	Starch and Sugar.
1.98	.264	7.92

Reckoning the oil as used for respiration, and computing it in proportion of 5 to 2 as compared with starch = ... .66

8.58

The food supplied to the cow consists of—

	Lbs.	Water.	Dry.	Albumen.	Oil.	Starch and sugar.	Fibre.	Minerals.	Phosphoric acid.
Hay, ...	22	2¼	19.36	2.03	.59	8.74	6.05	1.95	.30
Stored mangel, ...	35	28.0	7.	1.05	....	4.20	1.05	.70	.05
			26.36	3.08	.59	12.94	7.10	2.65	.35

	Oz.
The 13 quarts of milk yielded of butter, ...	13.60
Deduct for moisture, &c., ...	2.28
	11.32
Butter in the skimmed milk estimated as	.68
oz.	12.00
12 ounces of pure oil in the butter are ¾ lb. = lb.	.75
The oil in the food, ...	.59
The starch and sugar, ... 12.94	
Used for animal respiration, ... 8.58	
——	4.36

There appears, then, in this supply of food .59 lb. oil and 4.36 lbs. starch for the production of .75 in the butter from 13 quarts per day, the cow's greatest yield. At the time the milk was tested, aftermath hay was substituted for first-crop hay, in equal quantity. This, it will be observed, is decidedly richer in oil. Her produce had lessened to 10 quarts per day; her production of butter was 10.50 oz. per day, or of pure oil about 9 oz.; for the supply of oil the aftermath hay alone would be much more than adequate.

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On examining the adequacy of the food for the supply of albumen for the casein,

	lbs.
I find this to be,	3.08
I assume that in 120 lbs. of turnips, as required for maintenance, in a normal state,	1.98
	1.10

Which, according to Haidlen's analysis, will be adequate to the supply of 8.60 quarts per day. The supply of mineral substances is in excess.

The cow, under this treatment, gave—

Soon after calving, fully	13	quarts per day.
Five weeks after calving,	11¼	"
In less than 8 weeks after calving,	9	"

and with this there occurred also a loss of weight.

We find this cow, supplied with food amply rich in every element suited to her wants and purposes, with the exception of the nitrogenous principle only, lowering her condition, and likewise her yield of milk till it approaches a quantity for which her food enables her to supply a due proportion of casein.

About the 20th of April, the cow's yield being reduced to 9 quarts per day, her food was changed to steamed mixture; soon after this, her yield increased to 11 quarts per day. Her weight, April 28th, 9 cwt.; May 16th, 9 cwt. 14 lbs.; yield of milk, 11 qts.

I now introduce the dairy statistics of Mr. Alcock, of Aireville, Skipton, who has for some time been practising my method of treatment, with such modifications as are suited to his circumstances.

During the winter season, Mr. Alcock's food consisted of mangel, of which he gave 20 lbs. per day to each, uncooked, together with steamed food *ad libitum*, consisting of wheat and bean straw, and shells of oats.

	lbs. per day.
Carob bean and Indian meal, for each,	3
Bran and malt combs,	1¾
Bean meal,	3½
Rape cake,*	3
Of extra food,	11¼

* The rape cake used by Mr. Alcock was of foreign manufacture, evidently rich in oil, but containing mustard, and on this account supplied in less proportion.

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From March 19, when his store of mangel was exhausted, he increased his supply of Indian meal to 4 lbs. per day, and omitted the carob bean.

During the month of January, Mr. Alcock obtained from 759 quarts of milk, 1323 oz. of butter, being from each 16 quarts $26\frac{5}{8}$ oz. During February and March, from 7368 quarts of milk, 12,453 oz. of butter, or from each 16 quarts fully 27 oz.; so that rather less than $9\frac{1}{2}$ quarts of milk have produced 16 oz. of butter. The average produce from each quart of cream was $20\frac{1}{2}$ oz.

Mr. Alcock fattens his cows whilst giving milk, and sells them whilst giving 4 to 6 quarts per day. He quite agrees with me, that it is far more profitable to buy far milked cows for fattening; and obtains, from a change to his food, 2 to 3 quarts per day more than the cow had given previously.

Though Mr. Alcock's cream is not so rich as what I have described in a former Journal, it is more than ordinarily so. His mode of separating his milk from his cream differs from my own, his milk being set up in leaden vessels, from which, on the cream being formed, the old milk is drawn, by taking a plug from a hollow tube with perforated holes in the centre of the vessel. To this difference, I am disposed in some degree to attribute the less richness of Mr. Alcock's cream. On examining the cream with a spoon, after the dairy-keeper had drawn off the milk, I observed some portion of milk, which would have escaped through my perforated skimmer.

Mr. Alcock's proportion of butter from milk, which is the matter of practical importance, is greater than what I have shown in my former article, being from each 16 quarts of milk 27 oz. of butter.

Quality of butter.—In January, 1857, samples of about 56 oz. each of butter of my own, and also of Mr. Alcock's, were sent to the laboratory of Messrs. Price & Co's candle works at Belmont:

My butter was found to consist of, (taking the pure fat only)—

Hard fat, mostly margarine, fusible at 95°,	45.9
Liquid or olein,	54.1
	100.0

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Mr. Alcock's—

Hard fat, mostly margarine, fusible at 100°,	36.0
Liquid or olein,	64.0
	100.0

For these analyses of butter, the agricultural public are indebted to the good offices of Mr. George Wilson, director of Messrs. Price & Co's manufactory. It will be observed that Mr. Alcock's milk is richer in butter, and that his butter is also richer in proportion of olein to margarine than my own.

Professor Thompson ("Elements of Agricultural Chemistry," 6th edition, p. 317) states that winter butter consists more of solid, and summer more of liquid, or olein fat.

An analysis of butter made in Vosges, gives—

	Summer.	Winter.
Solid or margarine fat,	40	65
Liquid (or olein) fat,	60	35
	100	100

In Lehmann's "Physiological Chemistry," (Leipsic edition, vol. ii. p. 329) an analysis of butter by Bromus, gives—

Margarine,	68
Olein,	30
Special butter oil,	2
	100

It will be observed that my butter may be classed as summer butter, and that Mr. Alcock's is the richest in proportion of olein. Both were produced in the month of January.

These results are important, and completely establish the conclusion I had previously formed, that the quantity and quality of butter depend essentially on the food and treatment; and that by suitable means you can produce *as much and as rich butter in winter as in summer.*

From information derived from various sources in the district in which the same breed of cows is kept, the average quantity of butter from milk is somewhat more than an ounce to each quart,

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or from 16 quarts of milk 17 to 18 oz. of butter. This is during summer, and whilst the cows are at grass.

During the winter season the supply of butter from the dairy-keepers in this vicinity falls off to one-fourth of what they produce in summer.

I am led to infer that there is some misapprehension as to what forms the excellence of butter. On inquiring of a Jermyn-street factor, I learnt that rich oily butter is preferred in winter, and hard butter in summer. This preference to hard butter in summer will doubtless be owing to its withstanding better the effects of heat, and consequently being more palatable.

It seems probable that the higher price of butter, in comparison with that of suet or other solid fat, is due not only to its agreeable flavor but also to its proportion of olein, which is known to be more easy of digestion, and more available for respiration than solid or margarine fat. We find it preferred for pastry and other culinary preparations, in which its peculiar flavor disappears; the essential oil in which this resides being very volatile and easily removed by cooking or exposure to frost.

Olive oil, which amongst the vegetable oils has the greatest proportion of olein (72 to 28 margarine), is much used in culinary preparations, especially on the continent. Any one who has partaken of a beef-steak nicely prepared with refined olive oil in the cuisine of a first-rate foreign hotel, will scarcely detect the substitution of this oil for butter.

The price of refined olive-oil to consumers is about equal to that of butter; whilst that of linseed oil, rape, &c., ranges at from 4d. to 5d. per lb.

Use of Rape-cake.—Having had considerable experience in the use of rape-cake as food for cattle, I offer some suggestions to those who have been less accustomed to it, my consumption of this material for dairy cows and for fattening being upwards of twenty tons per year.

When I first gave an order to the manufacturer with whom I chiefly deal, about six years ago, on explaining to him the purpose for which I required it he requested time for its preparation, and recommended that I would give him, at the time the fresh seeds arrived, an order to the extent of my requirements for the year. As the quantity I ordered fell short, I sent for a further supply without notice; on its arrival I was not satisfied with its

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appearance or effects. On making a complaint, I was reminded by the manufacturer of his request that I would give him previous notice. He then explained that his object was to select seed free from mustard or other impurity. Since then I have had no occasion to find fault with the cake from this manufacturer.

A sample of this was found by Professor Way to contain, of

Moisture,	8.49
Woody fibre,	8.61
Starch, gum, sugar, &c.,	37.93
Albuminous matter	31.42
Oil and fatty matter,	10.65
Ash,	2.90
	100.00

I have occasionally bought German or Danish rape-cake; it is made up in thick square pieces of a rich green color, and not so hard pressed. An analysis of this by Professor Way gave, of albuminous matter 30 and of oil 13.16 per cent. Until this season I had no grounds to find fault with this foreign cake, but was satisfied to pay for it a higher price, owing to its superior richness in oil. In this season's importation I was led to suspect some admixture of mustard-seed. On macerating a sample in tepid water, I perceived an admixture of yellow husks, and likewise the smell peculiar to mustard. More completely to satisfy myself, I sent a sample to Professor Way, who reported it to contain mustard.

As dealers now charge a higher price for this material, for food, in comparison with what they charge for it as manure, they are clearly responsible for its being of a quality suitable for food.

To prevent the cake becoming mouldy, I cover it over with shells of oats which have been kiln-dried; chopped straw, if dry, would equally serve the purpose; by this means its flavor is also preserved—indeed, by keeping for a time, I find it becomes milder in taste, and more easy to masticate.

Management of Grass-land.—In describing the crops or produce adapted for dairy purposes, I think it proper to notice my treatment of permanent grass, meadow and pasture. I reside on the borders of a district in Yorkshire, over which you may travel 50 or 60 miles without seeing, except here and there, an isolated

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patch in tillage, and I am enabled to state, from observation, that in this extensive tract of permanent-grass the occupiers depend almost wholly on the excrement of their cattle for maintaining the fertility of their land. Whilst in some of the corn-growing districts the farmers purchase guano or other extra manure, at the rate of 20s. per acre over the whole of their holdings, by far the majority of those in the district I am speaking of (from which a continued deportation of cattle and also of dairy produce takes place), depend wholly for manure on the excrement from their stock, and do not replenish with extra materials.

As my own treatment of permanent grass differs materially from this, I proceed to describe it and its results.

My meadows, from their high condition, preserve their verdure through winter; during the month of March, and up to the first week in May, they afford excellent pasturage for ewes with their lambs, of which they carry at the rate of four per acre till the first week of May. Some portion is left untouched by sheep for early soiling, which I usually commence about the 26th of May.

From the 20th to the 30th of June my mowing for the main crop of hay usually takes place. The aftermath is again cut either for soiling or for aftermath hay, so that each meadow is mown twice during the season. After the second mowing a nice aftermath grows, which serves for the next year's ewes, which are bought early in October, and turned on the meadows together with their ram. Soon after the ground is clear, the weather being suitable (I prefer it cloudy or wet), the fresh excrement from the tanks under the tails of the animals is carted on and dressed in. The whole of my meadow land gets a dressing of this once a year. The excrement is quite free from straw. I formerly procured peat soil to mix with it to neutralize the smell; but am at present using for that purpose scrapings which are carted on, free of charge, by the conservators of the roads. Both for soiling and as aftermath the grass thus dressed is eaten with relish.

I find little difficulty in getting manure of this kind into the ground. During warm, moist weather, when the absorbent powers of the soil are in full activity, the whole dressing soon disappears. I have known the cocksfoot-grass, the property of which

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for quick growth as aftermath is well known, attain a height of three feet in five or six weeks after mowing.

In addition to this yearly dressing with excrement, I apply guano at the rate of 2 cwt. to each acre. I do this usually in the spring. I have, however, thought that I derived equal, if not greater, benefit from its application in very wet weather in November. The growth during March was sensibly greater than on adjacent land on which the guano was not applied till April; and the main crop of hay was certainly not less than on that dressed in April.

Mode of Haymaking.—As the process of hay-making differs so much, and is in some districts so inefficiently performed, I venture to describe the method I am using, and to which I give my personal attention. No farm operation requires greater care than securing the hay crop.

Till lately I deferred mowing the grass till it was in flower. In the year 1856 I cut it before the flowering time. Though this early cut grass shrinks more in the stack, yet I find it weigh proportionately heavier. It is not unusual for a square yard cut from the solid part of one of my stacks to weigh 30 stone imperial; I have known it exceed this. The solid part of a small stack of aftermath hay from seven acres of this season's growth weighed 26 stones imperial. I find it of advantage to employ a full complement of haymakers. In traveling through the country I have seen but one haymaker employed where I should have half a dozen. I find six haymakers, if fully employed, earn their 12s. or 14s. for one day far better than a single man would earn the same sum in six days.

The haymaking or tedding machine has in my practice superceded the expensive operation of spreading by hand. When the grass has been spread a sufficient time, the haymakers turn it with their hand-rakes from the sun or wind. At the close of the day the grass or hay is raked together in rows; the space between each row is left quite bare. In this state it remains over night, to prevent the bleaching effects of the falling dew and the moisture from the ground. Early in the morning, as soon as the bare ground between the rows is dry, the haymakers turn over the rows, the under side of which, and the ground on which they have laid, are completely wet from checked evaporation. This

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operation of turning is easily performed, and well repays the labor. When the ground is dry the tedding-machine is set to work, and the turning and drying are repeated. When the weather is at all doubtful we resort to the lap or shake cock, in making which the haymaker gathers up an armful, say 8 to 10 lbs. of partly dried grass, and lets it fall lightly on a heap. He then thrusts his hands under the heap, lifts and folds it without pressing, and sets the heap quite lightly on the ground with the end towards the wind: in appearance it is not unlike a lady's muff of large size. It is a common saying, that well made lap-cocks will stand a fortnight's rain free from damage. Without subscribing to this, I have no hesitation in stating, that in no form does partly-dried grass keep so well as in lap-cock. The rain falling on a lap-cock is thrown off in a somewhat similar manner as from an umbrella. I never recollect finding a well-made lap-cock thoroughly wetted.

By the mode I have described I accelerate the process of hay-making, and it is by no means uncommon for me to secure my crop in less than half the time required by my neighbors. On the hay becoming sufficiently dry, it is formed into wind-rows, and then drawn together by a sweep into large pikes of about three loads each, with conical tops which are slightly thatched with straw.* When the pikes have undergone a partial sweating, they are carted away and well intermixed in stacking. This pikeing before stacking, I find quite necessary with my rich quick-grown grass to prevent over-heating. Early in the mornings, and at other intervals, when not occupied with hay-making, the men hoe and clean turnips, &c. Though this district is high, and the climate rather wet, yet from 1847 up to the present time, I have succeeded in carrying the whole of each crop in good condition.

In stating the produce per acre, I give the ascertained weight of a great portion of the first crop, and the whole of the second crop, as weighed out of the pikes. The price of 6*d.* per stone, or 4*l.* per ton, is lower than the average value for a series of years in this district:

* Thatching the pikes is unnecessary except in a district where more than an average fall of rain occurs.—Ed.

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Average weight of first crop, gathered in June, 1856 ....2¼ tons.
Second, or aftermath, gathered first week in Sept., 1856, .1¼ "

4 tons, = £16 0 0
Pasturage from March to April, and in October and November,..... 1 5 0

Gross produce of one acre of grass land, ...£17 5 0

Estimating 1 ton of hay as equal to 6 tons of Swedish turnips, this produce of natural grass does not compare unfavorably with a root crop. One ton of well-gotten hay is, however, superior to 6 tons of Swedes, on account of its greater quantity of oil, which is, without doubt, one of the most valuable elements of food.

The meadows on which this produce is grown, are on strong clay, which, before draining, yielded but a scanty herbage, interspersed with rushes, and but a light crop of hay late in July.

The following is my treatment of my permanent pastures, which are heavily stocked during the summer season. The home pasture, of barely 15 acres, carries my 20 milk cows during the day. They are housed during the night. This clearing the pastures by night, has in some degree the effect of a change of pasture, and prevents their lying so much on the grass they eat. In addition to the 20 milk cows, 20 ewes, with their lambs, graze, and fatten on this home pasture of 15 acres. These ewes are supplied with ½ lb. of rape cake each per day. It will be observed, that the dung from the cows is likewise enriched by the extra food given to the cows in stall. Several times during the season, a laborer is sent round the pasture to spread about the dung: for this operation I prefer wet weather. My other pastures are also rich feeding pastures, and carry a beast, and an ewe, with her lambs, per acre. During July and August, the coarse tufts of grass in the pastures are mown and carried home for fodder for my horses. I prefer this pasture grass for horses to that from aftermath, which is too relaxing. These pasture mowings more than suffice for the bulky food for four or five horses during July and August. The surplus is partly eaten by the cattle, the remainder being converted into hay, and mixed with cut straw for steaming. After this mowing of the tufts, the pastures assume the appearance of aftermath, and the animals graze with appetite over the whole. Late in autumn and early in spring, the ewes are continued on these pastures, which they

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graze quite close. They are housed during severe weather and at night on boarded floors, and turned on the pastures during the day through winter in fine weather.

To these frequent cuttings of my meadows, and close grazing of my pastures, I am in some degree indebted for the excellent quality of their produce.

My successful use of rape-cake as food, has caused my attention to be given to the cultivation of the green rape plant for fodder, of which I produce two crops during the year. The sowing for one is made towards the close of June or early in July, after early potatoes, or on other vacant ground, enriched with the fresh excrement from my cattle. The produce from this sowing is cut towards the close of September, in October, and early in November. To ascertain the quantity, I measured out 400 square yards, which was cut in dry weather; the produce was upwards of $1\frac{1}{4}$ ton, being more than 16 tons per acre. This cutting was made before the crop had attained its full growth. The average over the whole would be more.

Towards the close of July or early in August I sow rape in a seed-bed, for which I use the headlands of crops which are horse-hoed. These plants are taken from the seed-bed and planted after lifting the potatoes in September or October, and produce a crop during the early part of May. Though the operation of planting out is somewhat tedious, yet the produce being available at a time when green food is scarce, I find its cultivation remunerative. My produce this season is equal to about 7 to 8 tons per acre. This spring crop is cut in time to be followed by cabbage and kohl-rabi.

The properties of green rape as food for sheep are well known. In Morton's Cyclopædia I find a complete analysis, showing it to be rich in flesh and fat forming constituents. Dr. Voelcker characterises it as richer in fatty matter than any other green crop used for food. During the month of October and early in November I give it both to my milk and fattening cows: they devour it with relish. I have as yet found no green crop equal to green rape at that season of the year.

In cultivating the cabbage and kohl-rabi, I find it advantageous to plant them in rows of 4 ft. to 4 ft. 6 in. apart, with potatoes

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between each row. As the potato forms its tubers and expands its foliage, whilst that of cabbage and kohl-rabi are comparatively small, I obtain an abundant crop of each. On the potatoes being lifted, the cabbages nearly cover the whole ground.

The produce of the cabbages exceeds that of any other vegetable I cultivate: yet on account of its flavor I limit its use to a less quantity than that of any other green food. The kohl-rabi, though not equally productive with the cabbage, is in flavor somewhat more agreeable.

Rotation of Crops.—The extent of land in tillage in my occupation being limited, my rotation is short, and consists of—

1st. Mangel or turnips, which are amply manured with fresh excrement from my cattle. I prefer plowing this into the ground in all its freshness; but as this is not always practicable in the autumn, when used in spring I mix with it guano, at the rate of 2 to 3 cwt. per acre, for the purpose of accelerating its decomposition. With the view of satisfying myself of the effect of this, I mixed a small quantity of guano in a garden-pot filled with fresh excrement; the effect was soon perceivable from a strong effluvium and an appearance of gaseous bubbles, and a change to yellowness of color, whilst a pot of excrement without guano in juxtaposition remained comparatively unchanged. This experiment was repeated in my vinery, at a temperature of 56°, with a like result. Before I resorted to this I observed a comparative slowness of growth of the root crop after the application of the fresh excrement, which I do not now perceive.

My mangel and turnip crops average, from actual weighings, about 25 tons to the acre, that of mangel being somewhat the heavier.

The estimate of the value of either of these crops is usually made on what it leaves for profit, and reckoned at 8*s.* to 10*s.* per ton. This is a very unsafe rule: if taken on its quantum of nutritive matter, it assumes a different value; as dry material, you cannot obtain any concentrated food equally nutritive at less than 7*l.* to 8*l.* per ton, which would give 16*s.* to 20*s.* per ton as the value in the natural state.

The great proportion of water contained in these roots would, however, prove a serious drawback to their extended cultivation for sale at a distance. You can convey in hay six times, and in

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oil-cake or beans twelve times, the quantity of nutritive matter contained in turnips. A consideration of this has often reminded me of the great additional labor incurred by those who give turnips wholly as food to the amount of 170 lbs. to 180 lbs. per day. A feeder who maintains 100 head of cattle will be conveying at the rate of 23 to 25 tons weekly of superfluous water from his field, of which the effect will be to increase the bulk of his manure without adding to its value. Some small advantage is derived from the watery property of the turnip, particularly when stored, in consequence of its supplying beverage in a less chilling state than by cold water alone, from drinking freely of which in severe weather I have seen cattle seriously chilled.

My crop in succession to mangel or turnips is that of beans, which I prize highly for my purpose, affording as it does a large amount of the nitrogenous element. I have hitherto cultivated the common kinds of field-beans. On the recommendation of an acquaintance, who stated that I might reckon on a much larger produce from the long-pod or garden-bean, in 1856 I set out amongst a crop of field-beans an interval of 1670 yards for trial of the sword variety of long-pod beans. The produce was carefully weighed and found to be of—

Field beans, white blossom, 52 bus., of 63 lbs., at 5*s.*,	£13 0 0
Straw, fully 2 tons per acre,	4 0 0
	£17 0 0

Long pods, on 1670 yards 1435 lbs. = 66 bus. of 63 lbs. per acre,	£16 10 0
Straw, 1¾ tons per acre,	3 10 0
	£20 0 0

The garden or long-pod beans having ripened a fortnight before the field-beans, and having been left standing till the same time, had lost almost all their leaves. Their appearance, however, denoted a less weight of straw even if cut sooner than the field-bean. The price of bean straw, 2*l.* per ton, is low in proportion to its value in the analysis given in Vol. XVII., p. 263, of R. Ag. Society's Journal.

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A sample of long pod beans gave the following composition on analysis by Professor Way:

Moisture,	12.50
Woody fibre,	4.35
Albuminous matter,	28.25
Oil and fatty matter,	4.05
Starch, gum, sugar,	46 95
Ash,	3.90
	100.00

On referring to the various analyses to which I have access, I find the comparison favorable to the long pod, which has less of woody fibre in proportion of 4.35 to 10.20, with more of starch in proportion of 46.95 to 42, and more of oil in proportion of 4.05 to 2 per cent. than the common or field bean. The cultivation of the long pod is precisely similar to that of the common kinds. The seed is strewed in drills or otherwise dibbled in rows two feet apart. The horse-hoe is applied several times between the rows, and every weed pulled up.

With the view of comparison I give the proceeds of my wheat crop of 1856. This is the third in my rotation, after which I again cultivate turnips or other green crops:

Average, 5 qrs. (63 lbs. per bushel) of wheat of good quality, at 62s.,	£15 10 0
Inferior wheat,	0 12 6
	£16 2 6
Straw, 38 cwt. per acre, 35s. per ton,	1 13 9
	£17 16 3

I state the price I pay for straw for fodder; every cwt. contains about 40 lbs. of starchy matter available for respiration, which I obtain, together with a small percentage of albumen, for 1*s.* 9*d.* per cwt. or 35*s.* per ton.

Treatment of Milk Fever.—Those of my milk cows which I retain for some time on hand are invariably in high condition, and on this account more liable to milk-fever. I think it pertinent to explain the method I use to prevent this malady. It is now six or seven years since I lost a cow from milk-fever. On conversing on the subject with a gentleman who had been on a

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visit to Mr. Fenton, who kept a considerable number of dairy cows near Rochdale, he described to me the means used by that gentleman, which, with probably some modifications of my own, I have since continued to apply. No difference is observed in the cow's treatment or food till the symptoms of calving appear. Her supply of water is then limited to about one-half of what she would drink. When she has calved, and for two days afterwards, she is plentifully supplied with a quantity of oatmeal gruel twice per day, with about two pounds of treacle each time in the gruel. No water is given separately; she is allowed her ordinary food. After calving she is milked every three to four hours for two days or upwards. The attendant is enjoined not to strip her milk clean, but leave a little in her udder, in the manner he would use in drying a cow of her milk. When two or three days are over, she is supplied with water and food *ad libitum*, and the ordinary process of milking clean twice per day resorted to.

The only instance of milk-fever since I adopted these precautionary means occurred in 1855, under the following circumstances. I bought a cow in July to calve in September; her appearance denoted good milking properties. She dropped her calf whilst out on pasture, and without giving the previous notice by filling the udder, or showing symptoms of giving much milk. I then told her attendant he need not use the precaution, but supply her with food and drink to promote her secretion of milk. Within two days of her having calved, the feeder came to me with the intelligence that she had dropped. On arriving at her stall, I found her case a decided and severe one. Having collected a sufficient number of assistants, together with our village druggist, Mr. Holden, who on occasions of emergency was called in to assist and on this occasion was the chief adviser, we resorted to the appliance of bags filled with the hot steamed food, of which there was a plentiful supply in readiness. These were placed along her spine and sides, and on cooling replaced with others; this operation was continued from noon until evening. During the same time men were continually engaged (relieving each other) in squeezing from her teats what little milk they could. The bags of hot steamed food had the effect of inducing a profuse perspiration. A dose or two of sulphate of magnesia were given, then linseed oil, but without effect; after this treacle

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with brandy in half-pint doses, to the extent of 10 to 12 pounds. She was several times pierced with the trocar to relieve her from gas by which she was distended. Aperient medicine was also given. The symptoms of the malady began to abate in the evening. Early next morning she was still lying, her pulse quite feeble, and other appearances of languor. On being supplied with a wine-glass full of brandy in some warm gruel, she raised herself on her feet, and recovered.

Pleuro-pneumonia.—During the year 1856, pleuro-pneumonia prevailed to some extent in the neighborhood, more especially amongst the dairy cows about Leeds. Its first appearance in my immediate vicinity was in the herd of my next neighbor, who lost several, and sent others off immediately for slaughter—in all 16 to 18. Towards the close of July, and during the hot weather of August, my own herd of cattle, more especially my milk cows, were also attacked. I sent some few off which were in a forward state of fatness; the return for these being small in proportion to their value for milking, together with the unpleasant idea of sending off animals at all ailing for slaughter, influenced me to use every means for their restoration, and to give their treatment my best attention. At first my treatment underwent various modifications, and I lost two cows. Without describing the change, I proceed to supply particulars of the treatment I afterwards adopted, and which I have since continued with little alteration.

My feeders are strictly enjoined without loss of time to report to me any appearance of ailment, a practice I strenuously recommend to any one who concerns himself about the treatment of his cattle when sick, more particularly as regards the disease of which I am speaking, the chance of success in which depends essentially on early application.

The first appearance which arrests the feeder's attention, is loss or partial loss of appetite. If, on examination, I detect any of the symptoms which characterize pleuro, viz., cough, quickness or deepness of respiration, loss of cud, and acceleration of pulse, intermittent warmth and chillness of horns and feet, I proceed at once to bleed till the pulse is sensibly affected: this requires usually 5 or 6 quarts to be taken. I then give—

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Epsom salts,	8 oz.
Sweet spirits of nitre,	1 oz.
Tarter emetic,	½ drachm.
Digitalis,	½ drachm.
Flour of sulphur,	4 to 6 oz.
Treacle,	16 oz.
Cocoa olein,	6 oz.

These ingredients are mixed and given in plenty of warm gruel, for which I use my pig food, boiled Indian meal, with about one-fourth proportion of pea-meal. On a renewal of the difficulty of breathing or acceleration of pulse, I repeat the bleeding to a less degree, say 3 quarts, and give likewise the tartar-emetic and digitalis in the gruel.

I continue to give, morning and evening, in gruel—

Sweet spirits of nitre,	½ oz. to 1 oz.
Flour of sulphur,	4 oz.
Treacle or sugar,	8 oz.
Cocoa olein,	4 to 6 oz

At noon I give gruel, with addition of a little sugar only. The doses of treacle and sulphur are modified so as to keep the bowels moderately open. It will be observed that I give Epsom-salts as the first dose, on account of their quick action, but afterwards I prefer treacle with sulphur. The patient requires watching with the greatest care. The sick room ought to be well ventilated at the top, but kept warm day and night; a depression of temperature or a draught has been observed to disturb the breathing. When the feverish symptoms have abated, I give oatmeal instead of Indian-meal in the gruel. I continue the cocoa olein in the gruel throughout, with doses of ½ oz. to 1 oz. sweet nitre, and 3 to 4 oz. of flour of sulphur. In several cases, when the pulse has become feeble, and below 60 beats per minute, accompanied by weakness and languor, I have given a wine-glass full of brandy in the morning's and evening's gruel with apparent advantage. The attendant is instructed to offer the animal change of food—brewer's grains, bran-mash, a little hay, grass, green rape plant, or other pallatable material. It is encouraging to find the animal begin to eat and make its selection of food.

Since I used the precise treatment I have described, upwards of twenty in succession have recovered. In this number I include

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those belonging to my neighbors who have used the same means under my advice and direction.

The time the cattle have been unwell, has ordinarily varied from 14 to 21 days; some have exceeded this. The healthy action of the skin is stimulated; the animals continue to lick themselves with little intermission throughout; they likewise retain, or otherwise resume their cud, under conditions I should not have expected; frequently, when supplied only with the gruel and its ingredients, with not more than a pound or two of hay per day, I have observed them cudding.

They have lost in live weight 1¼ cwt. to 1¾ cwt. A considerable portion of this will doubtless be in bulk from the use of the purgative medicines. The milk cows, whilst suffering, have reduced their yield of milk from 2 to 4 quarts per day; but on recovery, have almost wholly regained their former quantity. In no instance have I found a greater diminution than what might have been expected from the loss of condition and of time.

The cocoa olein is prepared in Messrs. Price & Co's candle manufactory expressly for cattle, being lower in price than what is used by medical practitioners.

In a conversation with Mr. Garnett, of Clitheroe, I learnt that some time ago he purchased eight or ten polled Galloways from a lot of 50 which were exposed in a market for sale. Nine weeks after this they became affected with pleuro-pneumonia, from which he lost the greater part of them. He afterwards learnt from the dealer from whom he bought them, that the remainder of the herd of 50, which were sold to six or eight parties who resided at a distance from each other, were also affected with the disease in the same week and with the like result.

From this, to which numerous instances similar in character may be added, we may infer that the origin of the disease is somewhat remote. The 50 Galloways being nearly the same age would have been purchased from various breeders, and sent together from Galloway to Clitheroe, a distance of 150 miles. It seems not improbable that from exposure to a sudden change of temperature to which they were subjected after they had been collected together by the dealer, the process of respiration has been impeded, by which some impurity of the blood is engendered, which

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slowly and imperceptibly increases until the symptoms I have described attract attention.

Cattle from Ireland are more subject to this complaint than others; they are brought on board vessels, crowded together in the hulls or on the decks, and on reaching land travel usually on foot considerable distances to markets for sale.

My milch cows are housed during winter in stalls of more than ordinary warmth, and are turned out to grass in the month of May, which in the season of 1856 was unusually wet and changeable; the pleuro has prevailed among them since July. At the commencement of this illness, the feeder states that up to the meal before the cow has eaten up her food, given her usual yield of milk, and shown every symptom of health; thus, though the disease has hitherto been imperceptible and of slow progress, it arrives at a stage to cause a sudden interruption of the functions, the cow's appetite is gone, and her yield of milk diminished to one-half of what she gave 12 hours before.

On applying the ear to the side of the animal you distinctly hear the air rushing past, but at the very early stage, as far as the ear can detect, with little or no impediment; the inhalations become frequent and labored. On opening the vein, if you place your finger in the stream of blood, a hot sensation is imparted: if you again place your finger in the stream towards the close of bleeding, the heat is sensibly diminished; the color of the blood also undergoes a perceptible change from a dark to a redder or brighter color.

A consideration of these symptoms seems to denote a greater consumption of carbon, for the combustion or oxidation of which it seems probable that the animal is prompted to exert her organs of respiration for the supply of the necessary air, whilst the blood at the same time is in an impure state. At this stage immediate relief seems requisite to prevent or arrest damage from over-exertion; with this object I resort to bleeding as the speediest means of subduing the fever and lowering the circulation. Tartar emetic and digitalis are known also to have the effect of retarding the circulation and lowering the pulse. It will be observed that I apply these necessarily in the very early stages; spirits of nitre and flour of sulphur, which are continued much longer, stimulate the secretions, and thus tend to purify the blood and the system.

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My observations lead me to think that the organs of respiration are on the first appearances, comparatively speaking, but slightly injured. It is not until after a lapse of time that with the ear we can perceive that dullness of sound which betokens injury. In the two which died we could distinctly trace the increase of this, until the flow of air on the one side seemed entirely to have ceased, whilst on the other we could plainly hear the air passing to and fro. On a *post mortem* examination we found the lung on one side completely damaged, whilst on the other it was but little affected. Whilst the greater heat of blood and the more frequent respiration denote an excessive demand on the carbon, yet at the same time the animal is devoid of appetite; the necessary consequence is a consumption of the components of the system. The fats will first be laid hold of, then, though probably not altogether singly and separately, the carbonaceous components of the fibrine, but as these materials are in succession less easily available, their consumption seems necessarily to imply a greater exertion of the organs of respiration.

These considerations have led me to resort to a supply of food rich in elements of heat, carbon, and hydrogen, in a form easily available for respiration. Indian meal is particularly rich in starch; by the process of boiling it approximates more nearly to sugar; together with this I give sugar and treacle in appreciable quantities, and also oleine oil. These ingredients are mixed and given in warm water. Starch, sugar, gum, dextrin, &c., are accounted the main supporters of the heat of animals when in health; they contain with carbon and hydrogen a considerable proportion of oxygen. On this account they require less of the oxygen of the air to effect their combustion. Their components are:

	Carbon.	Hydrogen.	Oxygen.
Starch,.....	44.45	6.17	49.38
Sugar, ...	40.00	6.66	53.54

The composition of oils differs very considerably from that of starch and sugar, oils being much richer in carbon and hydrogen with less of oxygen. They contain on an average of analysis.

	Carbon.	Hydrogen.	Oxygen.
Oil or fat,.....	78.13	11.74	10.13

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The following are ultimate analyses by Dr. Dugald Campbell, given in Dr. Thompson's lectures (p. 34):

	Carbon.	Hydrogen.	Oxygen.	Nitrogen
Cod liver oil,.....	80.18	13.72	5.854	.246
Olive oil,.....	69.38	13.47	17.092	.058

A proximate analysis by M. Braconnot of olive oil, one of the vegetable oils richest in olein, gives—

Of Olein	Margarine.
72	28

Vegetable oils or fats are observed to be much longer in undergoing digestion, and in their passage through the system, than the other elements of food. They contain in the same space the greatest proportion of elements necessary for the support of vitality, according to Lehmann, whose work I have recently been able to obtain, the first and second volumes in German, the third in English. I find in vol. iii., page 358, the following computation:—"If in a given time the organism absorbs 100 grammes* of oxygen, the following quantities would be necessary, in union with 100 grammes of oxygen, to satisfy the requirements of vitality;—Of fat, 34.23 grammes; starch, 84.37 grammes; sugar; 93.75. From which it will be seen that a pound of fat or oil in combination with the oxygen supplied by the air is equal to nearly 3 lbs. of starch or sugar."

Lehmann, vol. iii., pp. 336 to 339, gives a series of interesting experiments by Vierordt, who found the mean or his average respirations whilst in a state of rest to be 12 per minute, by which he expired 366 cubic inches of air containing 13.5 cubic inches of carbonic acid; by increasing his respirations to 96 per minute he expired 2,928 cubic inches, containing 79 cubic inches of carbonic acid. From this we learn that the organs of respiration are endowed with a capability far beyond the normal requirements, the volume of air being increased eight-fold, that of carbonic acid nearly six-fold. Had Vierordt been able to continue these labored respirations without damage to his organs, he must necessarily have consumed more food for the increase of carbonic acid, or otherwise have expended his own substance.

At page 381, vol. iii., Lehmann recites experiments carefully conducted by Hanover on patients suffering from pulmonary disease, which show that the absolute amount of carbonic acid

* 28 grammes and a fraction make an ounce.

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increases with the number of respirations, whilst the relative amount (that which is contained in a given volume of air) diminishes. These experiments tend to confirm in a remarkable manner my suspicions as to a greater consumption of carbon during this disease; they show also that the organs of respiration, though weakened, inhale a greater quantity of air, and exhale also an increased quantity, though less in proportion, of carbonic acid. From the diminished proportion of the carbonic acid to the volume of air in the increased respirations, it is clear that the system could not afford an adequate supply of carbon.

When in London I sought an interview with Dr. Theophilus Thompson, F.R.S., with the object of learning his views on the efficacy of oil as medicine, of which he has had great experience, and which I am informed, he first introduced into the London hospitals. In the course of conversation he drew my attention to several cases, in which his patients had gained more by the use of cod liver oil than the weight of the oil supplied. I ventured to suggest that this might possibly be attributed to the food being deficient in elements which are found concentrated in oil; in support of which I explained that in my treatment of dairy cows I have completely satisfied myself that by adding to ordinary food beans or other materials peculiarly rich in albumen but comparatively deficient in oil, I enrich the milk not only in curd but also in butter, to a far greater extent than is contained in the oil of such additional food.

Lehmann (Leipsic), second edition, page 271, states: "On theoretic grounds I have long been satisfied that fats belong to the most active agents in the metamorphosis of animal materials (of digestion,) and that by numerous experiments and observations I have completely assured myself of this (*that what had been matter of subjective, had by experiment become matter of objective certainty*)."

These experiments he explains, and cites others by Elsasser, which show that the digestion is materially assisted by an admixture of fat. I learnt from Dr. Thompson that cod liver oil is composed almost wholly of carbon and hydrogen, with a smaller percentage of oxygen than other fats. I did not ascertain from him, nor do I find in his lecture to the Medical Society, a copy of which he kindly presented to me, the relative proportion of

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oleine and margarine fats. In Royle's "Materia Medica" there is a proximate analysis of this oil by Dr. de Jongh; which gives—

Of oleic acid,	74.
Margaric acid,	11.75
Glycerine,	10.17
Butyric and acetic acid,	.11
Other substances,	3.97
	100.00

This analysis shows a far greater percentage of oleine compared with margarine than any other fat I have seen noticed.

That the nutritive effects of materials for food depend much on their proximate elements, I need only adduce the composition of the grain and straw of wheat, which are very similar in their proportion of ultimate elements, whilst the predominating proximate principle of the grain is starch (73 per cent,) that of straw woody fibre, of which it contains 61 per cent with only 36 of starch. That oleine is more easy of consumption (more available for respiration,) I refer to Lehmann, vol. i., p. 121, where he states that the fat of animals being found to contain a greater proportion in comparison with the fat of plants, may probably be attributable to the oleine being more easy of consumption.

My attention was drawn to some experiments of Dr. Leared, published in the "Medical Times," from which it appeared that the oleine of cod-liver oil agreed better with several of his patients than the oil in its natural state, from which he drew the inference that the effect of margarine was excrementitious; this can only apply to patients whose organs are weakened. My observations on feeding, tend to the conclusion that if you afford animals an adequate supply of sugar, starch, and olein fats for their respiratory and other functions, the margarine of the food will be converted into and stored up in animal fat to the extent which the system is capable of absorbing. I am, however, clearly of opinion, that on a deficiency of food, or incapacity of the organs from disease or other causes, to supply the wants of respiration, the stores of solid or margarine fat are laid hold of and consumed. In the spring of 1853, I sold some fatted cattle to Mr. Freeman, of Otley, with whom I had frequently dealt; he reported that they did not contain the quantity of loose fat which he had been

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led to expect from their touch and his experience of my feeding. Having told him that they had recently suffered from soreness of mouth, by which, with evident symptoms of appetite, they were hindered from eating the necessary quantity, Mr. Freeman remarked that he well knew from experience that cattle which had recently suffered from this, (known here as the mouth and foot sore complaint,) were deficient in loose fat. I may also here state, as a matter of some physiological interest, that cattle which have been partially damaged in the lung from previous attack of pleuro, or other causes, are invariably found deficient in their store of loose fat.

It will be observed, that cod-liver oil contains in the same space the greatest proportion of elements which, in combination with the oxygen of the air, are necessary for the support of vitality, and with this by far the greatest proportion of olein in comparison with other oils in their natural state; and it seems worthy of remark, that this oil is held in the greatest esteem for pulmonary complaints; next to this, and almost in equal repute, is pure olein.

From what has been premised, it will be found that from consideration of the symptoms of pleuro-pneumonia, I was led to suppose an abnormal consumption of the elements which support respiration. I have sought to meet this by a supply of food particularly rich in such elements, and in a form most available for their purpose. My observations on the effects tend to confirm my opinion that by this means I supply in food what would otherwise be abstracted from the system with greater labor to the organ, and with impoverishment, thereby weakening the ability to resist disease. I am therefore encouraged to offer it for the consideration of those who give their attention to pathological chemistry.

If any owners of cattle should adopt my treatment, I urge the most scrupulous attention to the treatment here prescribed for the sick animal. I am clearly of opinion that one of the animals which died might, by a greater observance of this, have been restored.

In the course of the foregoing observations, I have made frequent allusion to Lehmann's "Physiological Chemistry." About a year since I obtained this work on loan for a short time from a

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member of the Pharmaceutical Society. A perusal of such portions as seemed likely to afford me the particular information I was then in quest of, disclosed to me the pen of an author, master of his subject, and of great research and acquirements. With some difficulty, and through the kind assistance of others, I have recently obtained the whole work, three volumes, the first and second in German, the third in English. I learn that in both languages it is out of print. I cannot but hope that ere long another addition of a work, every page of which is replete with information of peculiar interest, will be published."

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